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IN SEARCH OF A Storage Symphony

For now, enterprise customers are stuck with storage management point tools.

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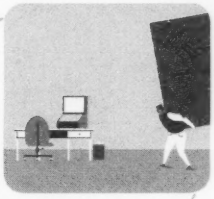
COVER STORY

In Search of a Storage Symphony



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Fresh Insights
New Trends
Great Ideas

HeadsUp

MOBILE DEVICES

Flight Attendants to Use Galaxy Notes

AMERICAN AIRLINES said it plans to purchase about 17,000 first-generation Samsung Galaxy Note devices for use by cabin crew members during flights.

Flight attendants will use the combination smartphone/tablet to record passengers' meal and beverage preferences, and to access information such as customer names, seat numbers and special assistance needs. The airline will begin deploying the devices later this year and expects to continue the rollout through mid-2013.

American decided to use Galaxy Notes after completing a pilot program in which 40 flight attendants tested several devices and gave feedback about their preferences.

According to the airline, the testers liked the Note's thin design, its security features and its HD display. They also liked the fact that they could hold the device in one hand and easily slip it into a pocket.

American Airlines CIO Maya Leibman said the Note rollout is part of a corporate program that includes pioneering new technologies "to build a new American and return to industry leadership."

As part of this initiative, the airline will also expand the use of tablets in the cockpit during all phases of flights; American is the first commercial airline to receive FAA approval to do that.

Eventually, American hopes that crew members will be able to use tablets to give passengers timely information about connecting gates, flight delays and weather issues.

– Matt Hamblen

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OPERATING SYSTEMS

Win Server 2008 Gets 18 Months of Added Support

Microsoft has extended mainstream support for Windows Server 2008 by 18 months.

Announced in the latest Microsoft Support Lifecycle newsletter, the extension was triggered by a company policy that requires an extension if the follow-up product is slow to arrive, among other reasons.

"The Microsoft policy provides a minimum of five years of Mainstream Support or two years of Mainstream Support *after the successor product ships*, whichever is longer," the newsletter said (emphasis in original).

Microsoft considers the true successor to Server 2008 to be Server 2012, which debuted last month. The September debut pushed the end of mainstream support for Server 2008 from July 9, 2013, to Jan. 13, 2015. The end of extended support for Server 2008 is now Jan. 14, 2020.

In mainstream support, Microsoft offers security patches, general fixes and feature updates free of charge. During extended support, which runs five years beyond mainstream support, it offers free security updates only but will provide non-security-related bug fixes for a price.

Support extensions are not unprecedented. Microsoft recently prolonged support for the consumer versions of Windows 7 and Windows Vista by five years to sync them with the enterprise editions' life spans.

– GREGG KEIZER

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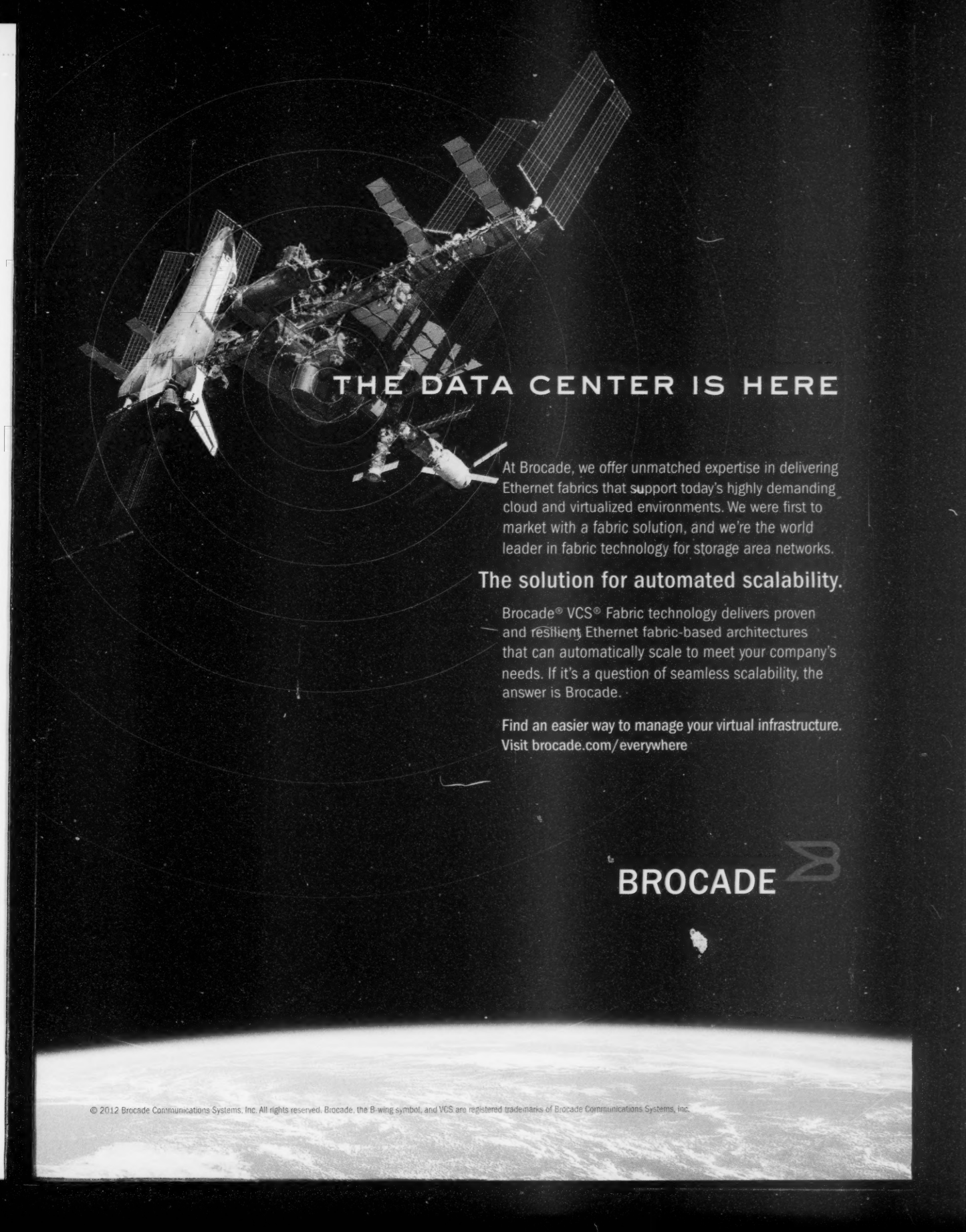
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By John Klossner

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HARDWARE

Dell Supercomputer Spawns New Servers

DELL HAS DEVELOPED a line of servers based on designs the company is using in an upcoming 10-petaflop supercomputer called Stampede, which will be fully deployed at the University of Texas, Austin, starting next year.

The PowerEdge C8000 servers are built with standard Intel x86 CPUs and can be equipped with graphics processors or additional storage to improve performance on database tasks, high-performance computing operations and cloud workloads.

Users will be able to mix and match graphics processors, storage, memory and other elements inside the servers, said Armando Acosta, a product manager at Dell.

For its part, the Stampede supercomputer includes thousands of C8000 servers with a total of 272TB of memory and 14 petabytes of storage. Dell and the Texas Advanced Computing Center at the University of Texas worked together on Stampede. The design for the C8000 servers blossomed as the supercomputer came to fruition, Acosta said.

The supercomputer will use eight-core Intel Xeon E5-2600 processors and co-processors code-named Knights Corner, which Dell said will speed up scientific and math calculations.

As for the new servers, the basic C8220 chassis can have up to eight blade servers; each server can contain two CPUs with up to 16 processing cores, two internal hard drives and additional storage and networking options. For instance, the servers can be hooked up to the new C8000XD storage box for expandable hard drive or SSD options.

The C8220X, a more advanced model in the new lineup, has more RAM and storage and can be equipped with graphics processors. All of the servers are designed for use in highly parallel computing environments, Acosta said.

Pricing starts at $35,000 for the C8220, $42,000 for the C8220X and about $25,000 for the C8000XD storage box.

– Agam Shah, IDG News Service

Micro Burst

IT INDUSTRY

Hewlett-Packard will eliminate

25%

of its PC models as part of its turnaround plan.

SOURCE: HEWLETT-PACKARD

BIG DATA

Beware of BI Vendor Hype About Hadoop

If a business intelligence (BI) vendor tells you that its products are integrated with Hadoop, you should ask a lot of questions.

The hype around Hadoop has pushed many BI vendors to declare their support for the big data technology without explaining exactly what that means, Forrester analyst Boris Evelson warned in a recent blog post.

"Hadoop is not a single entity. It's a conglomeration of multiple projects, each addressing a certain niche within the Hadoop ecosystem, such as data access, data integration, DBMS, system management, reporting, analytics, data exploration and much, much more," he wrote.

If you're considering a BI tool for Hadoop environments, you need to know whether the tool works with the community version of Hadoop and with commercial versions sold by vendors such as Cloudera and Hortonworks, Evelson said.

It's also important to find out which specific components of Hadoop the BI tool integrates with. Hadoop technologies include Hive, Hbase, Pig and Sqoop.

"You really need to peel a few layers of the onion" to confirm whether any given BI tool can really work with Hadoop, he wrote.

– JAIKUMAR VIJAYAN

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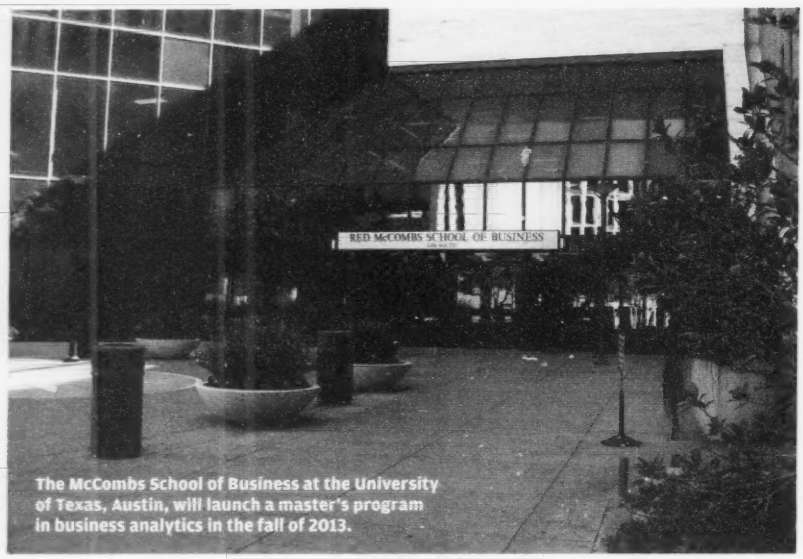

The McCombs School of Business at the University of Texas, Austin, will launch a master's program in business analytics in the fall of 2013.

Grad Schools Add Big-Data Degrees

Master's degree programs in analytics emerge amid projections of a talent shortage – and in response to lobbying by big companies. By Patrick Thibodeau

COLLEGES AND UNIVERSITIES are moving swiftly to create advanced degree programs to help meet what's expected to be rapidly rising demand among employers for specialists who can manage and analyze big data.

The schools are likely aware of a McKinsey report warning of a mega-shortage of analytical experts that could leave as many as 190,000 positions unfilled by 2018. They're also responding to appeals from big employers like IBM and SAS Institute that have been lobbying college administrators to set up such programs.

Schools have offered analytics training for years, but the emerging advanced degree programs add instruction in the use of analytic and business intelligence tools to produce useful information from petabytes of data collected from social media sites, sensors, transaction records, mobile applications and other sources.

A common element of all of the newer programs is that they're designed for students with strong quantitative skills gained either academically or through work experience in fields related to math, computer science, engineering, life sciences or finance.

The McCombs School of Business at the University of Texas will launch a master of science in business analytics program in the fall of 2013. "There is a lot of demand for people who can say something meaningful about the data that is accumulating," said Prabhudev Konana, chairman of the university's Department of Information, Risk and Operations Management.

The university plans to begin the 11-month, full-time program with 50 students, but it expects the number of applicants to be significantly higher.

Based on inquiries so far, "getting 50 [students] is not going to be the issue; figuring out where we want to cap it might be the bigger issue," said program director Michael Hasler.

North Carolina State University launched what may have been the nation's first advanced degree program in analytics in 2007, and the school recently finished expanding its facilities to meet surging demand. The program's class of 2013 has 84 students who were selected from a pool of 272 applicants.

North Carolina State said each of the 38 students that completed the program this year received a job offer. The average base salary was $89,100 overall, and $100,100 for students with prior job experience. Moreover, 60% of the students received signing bonuses that averaged $16,000, the school reported.

Meanwhile, Northwestern University last month launched a new 15-month, full-time master of science in analytics program, said Chris Bray, assistant director of the program.

One-third of the 32 students in the Northwestern program enrolled directly from undergraduate programs, another third have one to five years of work experience, and the remainder have five to 10 years of experience. The median age of students is 27, said Bray.

Noting that the program was developed with the help of IBM, Bray said the curriculum covers IT, data science and business, to teach students to analyze data and "communicate the value of it."

Similar graduate programs are in the works at New York University's Stern School of Business, the Dearborn College of Business at the University of Michigan and Loras College in Dubuque, Iowa.

Louisiana State University last month announced that it's collaborating with SAS, a maker of business analytics tools, to create a master of science in analytics program. LSU said nine students completed a pilot analytics program offered during the previous academic year, and each student got a job within weeks of graduation. ◆

> "There is a lot of demand for **people who can say something meaningful** about the data that is accumulating."
>
> PRABHUDEV KONANA, CHAIRMAN OF THE INFORMATION, RISK AND OPERATIONS MANAGEMENT DEPARTMENT, UNIVERSITY OF TEXAS

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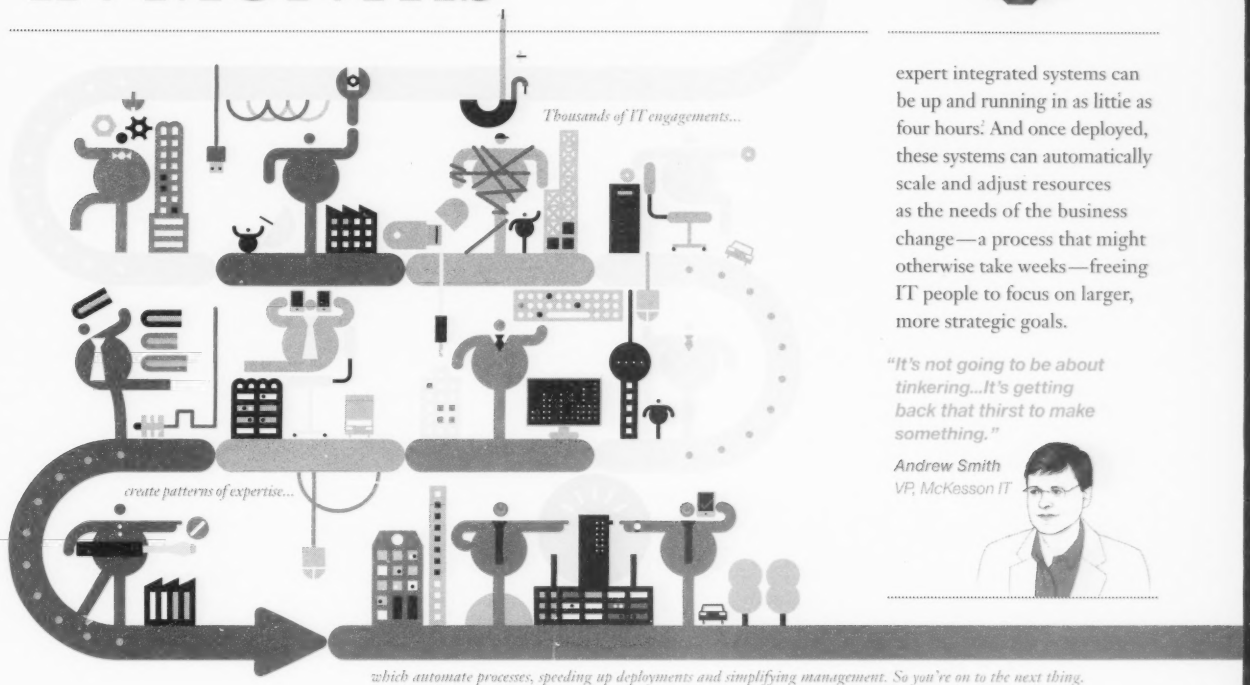
FROM DEPLOYING IN MONTHS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expert integrated systems can be up and running in as little as four hours.[2] And once deployed, these systems can automatically scale and adjust resources as the needs of the business change—a process that might otherwise take weeks—freeing IT people to focus on larger, more strategic goals.

"It's not going to be about tinkering...It's getting back that thirst to make something."

Andrew Smith
VP, McKesson IT

TO READY IN HOURS.

According to Forrester, the typical IT department spends at least 33% of a project's budget just specifying, designing and procuring IT components. And once procured, it can take up to three months of tweaking before those resources are ready to be used.[1]

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1. Based on a 2011 commissioned study conducted by Forrester Consulting on behalf of IBM. 2. Based upon testing of the IBM PureApplication System W1500-96 with time measured from powering on the system to when it is ready to support application deployments and based upon testing of the IBM PureFlex System Express & Standard models containing one chassis and one compute node with the time measured from powering on the system to when it is ready to support a virtual image deployment. IBM, the IBM logo, ibm.com, PureApplication, PureSystems, Smarter Planet and the planet icon are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. A current list of IBM trademarks is available on the Web at www.ibm.com/legal/copytrade.shtml. © International Business Machines Corporation 2012.

Microsoft Pitches New $10,000 Visas

The company says its proposed H-1B program could fund STEM education to help U.S. students develop tech skills. By Patrick Thibodeau

WHEN THE recession hit in 2008, Congress and big tech employers mostly shelved the idea of creating more H-1B visas to combat what some described as a skills shortage. This year, however, proposals for overhauling work visa programs have re-emerged as demand for H-1B visas has strengthened.

The federal government begins accepting H-1B applications for the coming fiscal year on April 1. And this year, the number of applications for fiscal 2013, which began Oct. 1, exceeded the annual cap of 85,000 visas in 30 days. At the height of the recession, it could take as long as 10 months to hit the cap.

Plans to loosen visa restrictions are being put forth in Washington, including a proposal from Microsoft, whose employment circumstances have changed for the better since it laid off some 5,000 people in 2009.

Microsoft executives late last month said that the company has about 6,000 open jobs in the U.S. and is creating new positions faster than it can fill them.

In remarks delivered at the Brookings Institution in Washington, Brad Smith, Microsoft's general counsel and executive vice president, cited the company's workforce needs when he made a case for new types of H-1B visas and permanent employment visas.

Smith proposed that Congress should help employers find qualified workers by adding 20,000 new H-1B visas and an equal number of green cards for people with jobs tied to science, technology, engineering and math — the so-called STEM fields.

Microsoft's novel plan would require that companies pay the government $10,000 for each new "supplemental" H-1B visa and $15,000 for a STEM green card visa. The proceeds — estimated at up to $500 million a year — would be invested in education, particularly STEM programs.

Smith said that 3,400 of Microsoft's job openings are for researchers, software developers and engineers.

"Our nation faces the paradox of a crisis in unemployment at the same time that many companies cannot fill the jobs they have to offer," Smith said.

He warned that if the positions can't be filled locally, "we risk these jobs migrating from the U.S., creating even bigger challenges for our long-term competitiveness and economic growth."

Smith said Microsoft currently spends 83% of its R&D budget in the U.S.

Microsoft's visa plan will likely get support from groups that are advocating for skilled immigration. Meanwhile, there's support in Congress for plans to expand the green card program for foreign students who earn advanced degrees in this country. Backers of such a policy argue that it's advantageous to keep those advanced degree holders in the U.S. because they could be IT and business innovators.

Lawmakers probably won't take a close look at Microsoft's proposal until the next Congress is seated.

Ron Hira, a public policy professor at the Rochester Institute of Technology, took issue with Microsoft's claim that there's a scarcity of skilled IT workers that's due in part to a decline in the number of college students pursuing computer science degrees.

"Why are kids not going into IT? Because of industry employment relations," said Hira. "Is there a shortage of people going to medical school or even law school or investment banking? No, because smart kids know that [those are] reasonable career paths."

In the late 1990s, the number of computer science grads doubled, and Hira believes it could double again. "Why not focus efforts on that instead of importing guest workers?" he said. ◆

Grant Gross *of the IDG News Service contributed to this story.*

> "Our nation faces the paradox of **a crisis in unemployment at the same time that many companies cannot fill the jobs they have to offer.**"
>
> — BRAD SMITH, GENERAL COUNSEL AND EXECUTIVE VICE PRESIDENT, MICROSOFT

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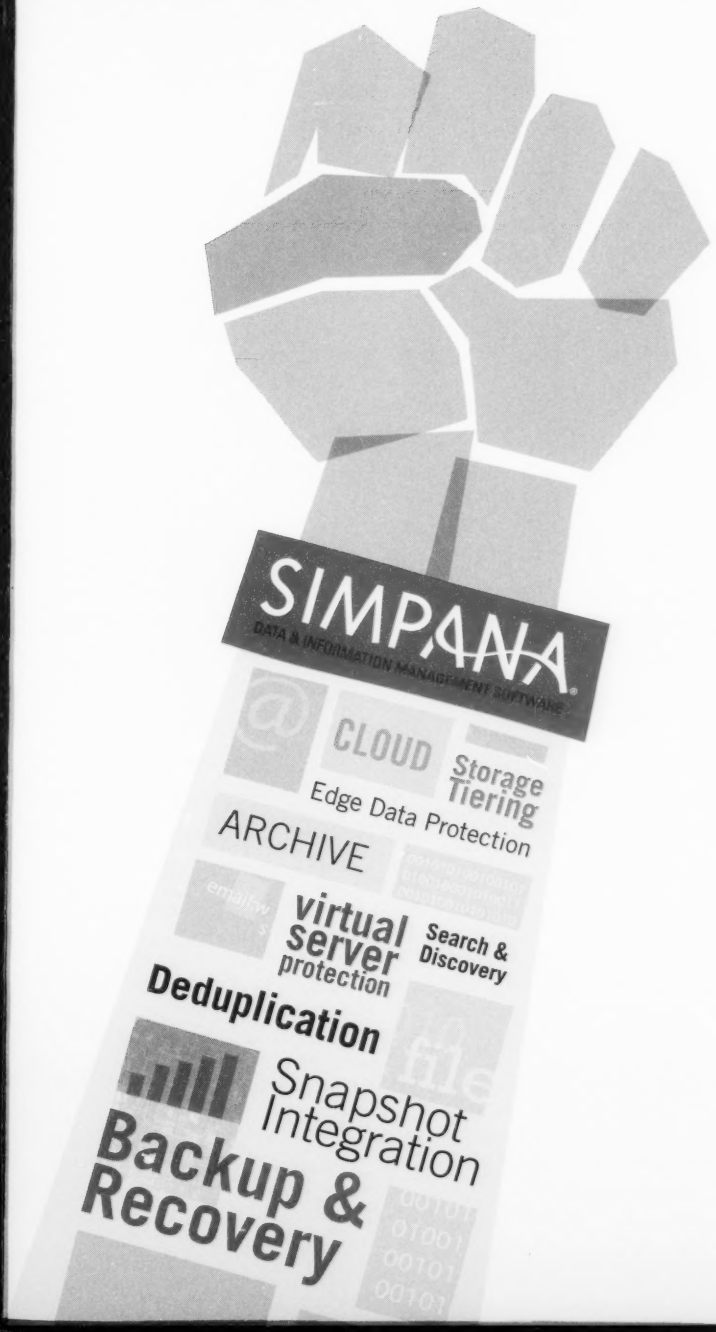

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THE Grill

Kevin Kometer

CME Group's CIO has learned to master large-scale mergers.

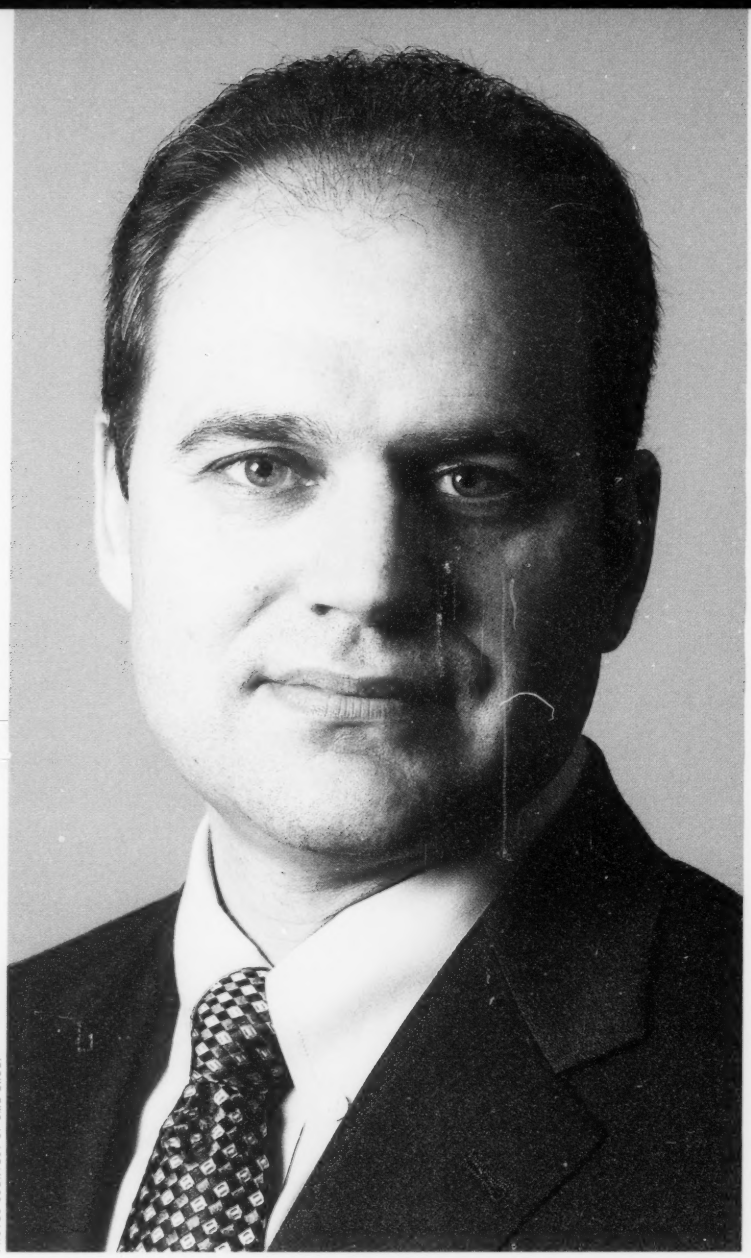
What's your favorite technology? The iPad

Is there something that most people don't know about you? I was turned down for my first job in technology – they didn't think I would stay in the [IT field].

Have you read any good books recently? *Zero Day*, by David Baldacci

What do you do during off-hours? I have four kids, so that consumes a great deal of time. They all love the water, just like me, so we enjoy boating and Jet Skiing. I also love golf and tennis.

What do you like most about your job? It's never boring – ever.



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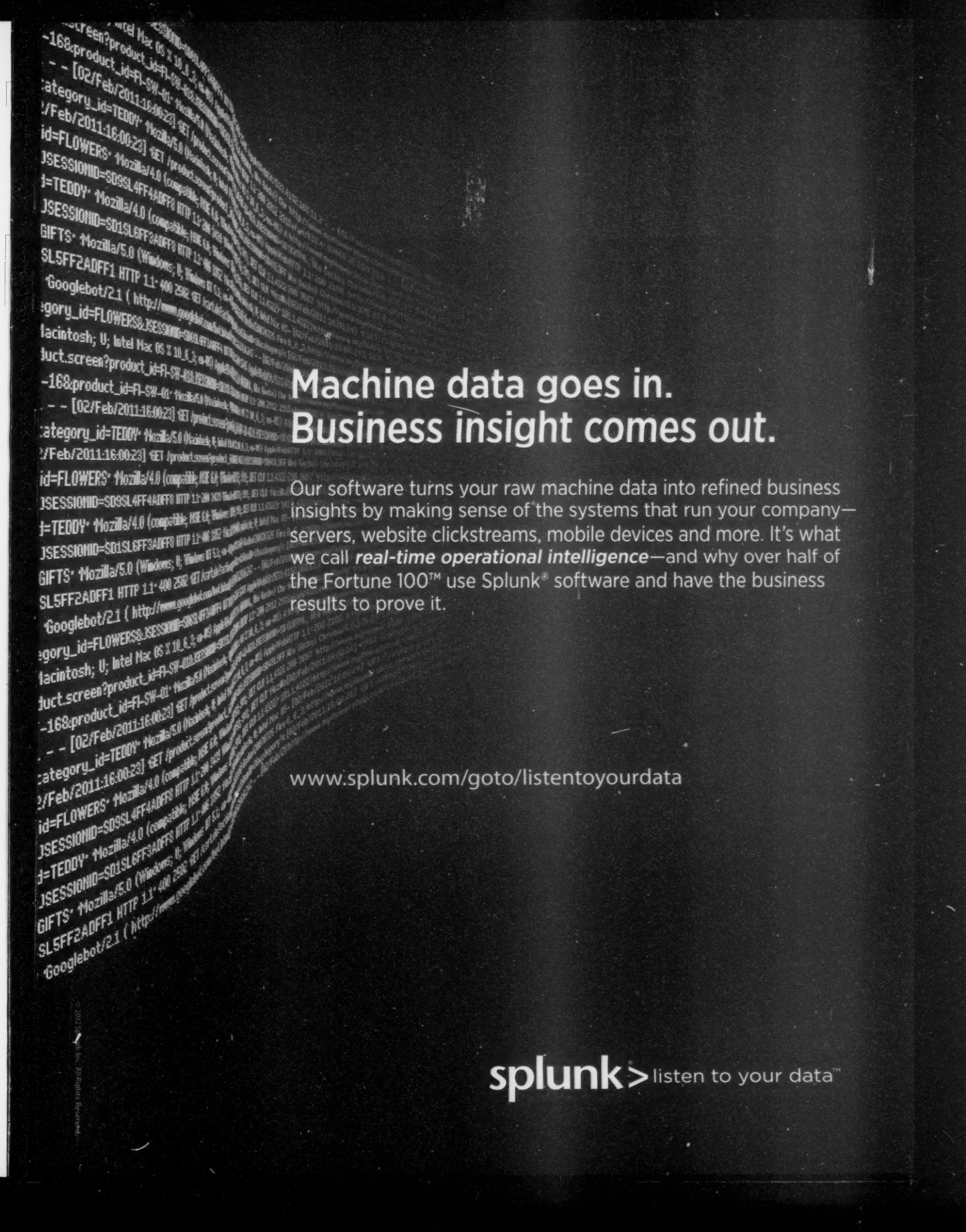
AS SENIOR MANAGING DIRECTOR *and CIO at CME Group for the past five years, Kevin Kometer oversaw IT operations during the futures exchange's merger with the Chicago Board of Trade and its acquisition of The New York Mercantile Exchange. He is responsible for advancing the global growth of the company's IT infrastructure, including technology distribution for 15 strategic partnerships and 10 telecommunication hubs around the world. Last year, CME processed almost 3 million futures contracts. The company is currently rolling out the next version of its 20-year-old Globex electronic trading system.*

You've led several mergers since becoming CIO. What key lessons have you learned about integrating disparate platforms? I would say it's all about setting expectations early on as it relates to the direction of these platforms and the scope. So we created a nice framework going from high-level planning with significant leaders down into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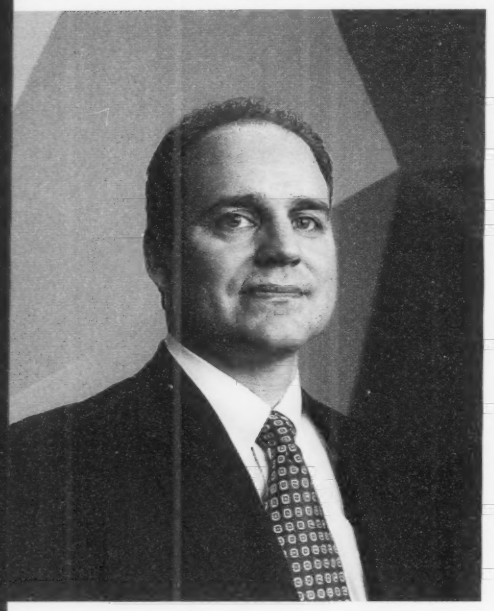

> **Things are increasingly real-time,** and that's driving the need for more real-time data . . . and it drives an awful lot of risk management as well.

detailed planning thereafter. You do need to lock in the scope and expectations so you can get the teams on both sides — the company you're acquiring and your company — working toward the same goal.

What about project scope creep? How do you handle that? It often happens, and it's [not uncommon] when you're dealing with two different companies and you've got bias toward one system versus the other. You've got to keep your eye toward what the goals are, whether its synergy or functionality, and make sure the business is aligning with its decision-making toward those goals.

Has the consumerization of IT challenged CME? And how have you addressed the issue of employees using their personal mobile devices on the job? We've been largely a BlackBerry shop. We decided the biggest factor is security. So we came up with [a policy] we felt comfortable with from a security perspective. [We have] some basic security requirements, such as wiping, and a list of phones we're comfortable providing. We've allowed our staff to choose from that list. We definitely see an appetite for the iPhone. So we've rolled out iPhones quite a bit over the last year.

Where do you stand with mobile device management and controlling access to corporate data? We're actually in a proof of concept right now with mobile device management. The information that goes onto mobile devices from a corporate perspective is mostly email, messaging and things of that nature. We're preparing to do more in the future. But we want to make sure we have the ability to control that before we provide access to more data right now.

What keeps you up at night? I wouldn't say anything keeps me up at night. We certainly spend a significant amount of time dealing with capacity, and performance and scalability. That's an ongoing activity in this industry. I wouldn't say there are limitations there as much as trying to stay in front of the customer demand and the volume.

What current or upcoming technology do you see as a game-changer in the data center, and why? I think we're certainly tackling many of the same problems other companies are. We're looking at interesting solutions for the big-data problems. Things are increasingly real-time, and that's driving the need for more real-time data . . . and it drives an awful lot of risk management as well.

So we're looking to bring in a number of solutions outside of your traditional relational databases. We're implementing Hadoop, Exadata from Oracle — things of that nature.

How far along are you toward rolling out Hadoop? We've got a basic implementation right now. We're working on fine-tuning that and working through a few configuration and performance challenges.

What are you going to be using Hadoop for? Initially, mostly historical market data. Think of it as a market data repository that can be leveraged throughout the company for a variety of things, and ultimately passing that out to the customer.

What does the Globex upgrade involve? We're moving to some new switches. We're running mostly on Cisco switches at this point. We're moving into some new hardware. We've rewritten the gateways with some different coding techniques. We're mostly a Java shop, so we're minimizing garbage collection and doing a better job with threading and things of that nature.

We were in the proof-of-concept and planning phase late last year. That quickly went from proof of concept to execution at the tail end of last year. We will see 50% to 75% improvement in variability and processing time of Globex orders and market data.

If you could offer one piece of advice to young IT professionals aspiring to become CIOs, what would that be? I would try to coach them into exploring a number of different responsibilities within IT. Too often you see an IT professional start out on the infrastructure side and stay there, or start off in the application development side and stay there.

To become an effective CIO, you need to explore opportunities in a number of different IT functions that will give you exposure to many businesses you may be supporting. That collective experience will prepare you best for becoming a CIO.

– *Interview by* **Lucas Mearian**

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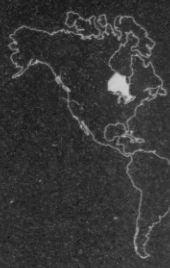

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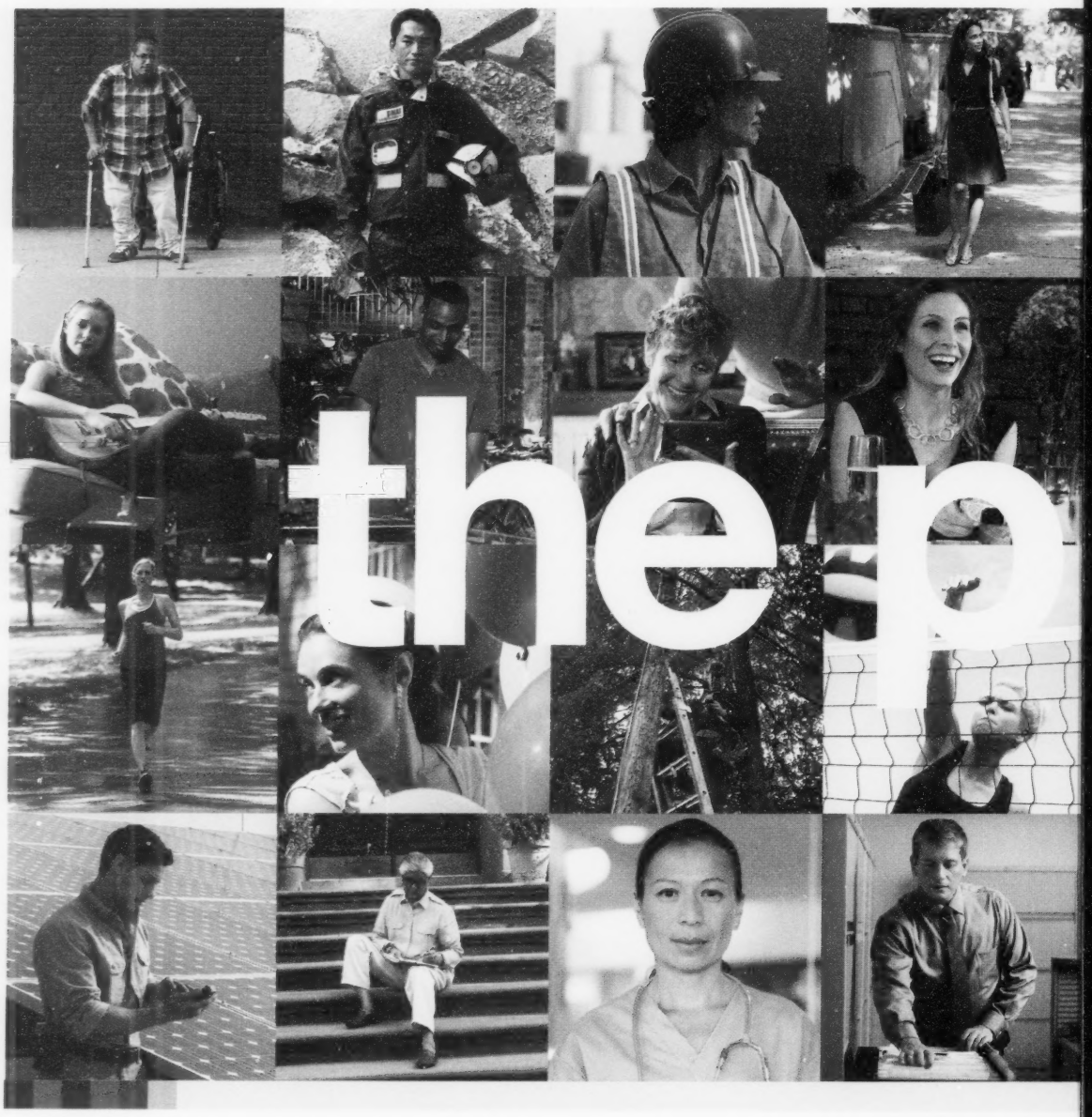

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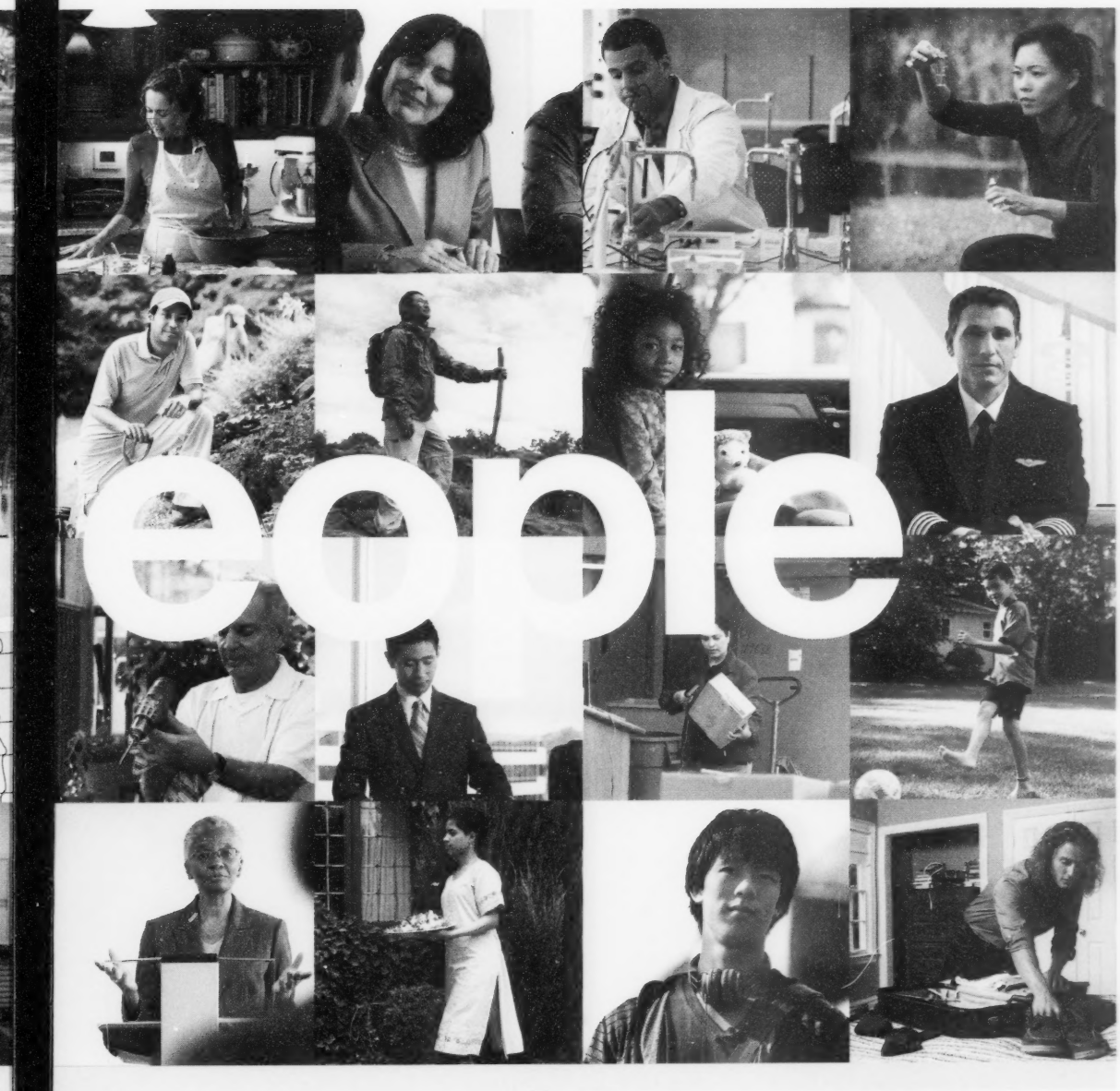

NTT DATA

Global IT Innovator

IN SEARCH OF A Storage Symphony

Storage orchestration software holds the promise of seamless management.

But for now, enterprise customers are stuck with point tools.

BY ROBERT L. SCHEIER

FOR CASH-STRAPPED IT SHOPS looking to get out from under manual storage management chores, storage orchestration software looks like a lifeline: It promises to let users choose from a catalog of predefined storage services and then handle the provisioning details behind the scenes.

It's a worthy vision, and one vendors are moving toward. However, there's currently no "single pane of

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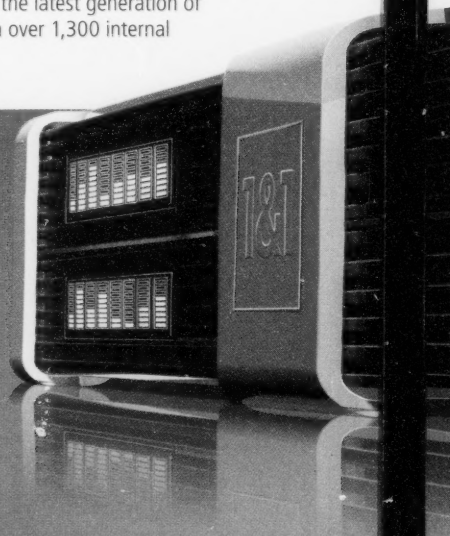

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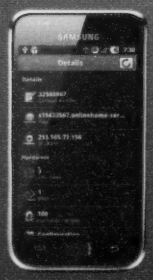

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glass" product that can automatically provision, resize, back up and recover storage across multiple public and private clouds, across systems from different vendors and for virtual machines running hypervisors from multiple vendors. Most orchestration tools support only a single product line, are optimized for certain functions or don't support the public, multitenant object-based storage services that provide the lowest cost and most flexibility.

It's even more rare to find orchestration tools that can manage both virtual machines and storage. Creating true global orchestration is an expensive, complex task usually tackled only by the largest enterprises or service providers that can spread the investment across multiple customers (see story below).

Today, storage management is "very fragmented, and things don't necessarily work well together," says Forrester Research storage analyst Andrew Reichman. "For the most part, [tools] are quite expensive, complex to use and have mixed results with [other vendors'] products. . . . The automation level of storage lags that of servers," especially when comparing storage management systems with server virtualization platforms such as VMware. With storage, "there is still a lot of manual, mundane work being done," says Reichman.

Despite some acceptance of standards for defining common storage and server functions, vendors are understandably reluctant to use them to make it easier for customers to move data from their products to those of their competitors. Some are also too busy integrating technologies they have acquired to focus on interoperability with their competitors.

Many of today's orchestration platforms are more like service catalogs that offer various service levels for different applications and use application programming interfaces (API) to storage and server management tools to deliver the services. HCL Technologies' MyCloud, for example, is "not like a management tool, but more like an aggregation platform [that] can integrate with the native management tools" from infrastructure providers such as VMware or Amazon, or existing management vendors such as BMC or CA, says Kalyan Kumar, associate vice president and head of cloud at HCL. Customers can request compute and storage services through it, but they must log in to each platform's management console to perform more sophisticated operations, such as archiving data, he says.

In the absence of universal orchestration, customers are using tools that support their hardware and software to solve problems in areas such as application availability, disaster recovery and quality of service. These products fall into several broad categories.

Storage 'Hypervisors'

A growing number of vendors are offering "storage hypervisors" that virtualize the storage and, in some cases, their associated file servers to create scalable, flexible pools of storage. This virtualization layer often runs on standard x86 servers and is optimized for specific functions, storage protocols or applications. One example is DataCore Software's SANsymphony-V, which links to VMware's vCenter to automatically discover VMware servers running in a customer's environment. A systems administrator can then associate a given class of storage with various servers, and SANsymphony automatically provisions it.

Hosting and integration services firm Amnet Technology Solutions has been using SANsymphony for close to three years, and senior technologist Rich Conway says the product has provided "absolutely phenomenal" redundancy. "The entire storage infrastructure was essentially mirrored, where both sides are active/active, and if any component of either side fails for any reason, our entire grid stays up and our customers don't even notice," he says. SANsymphony has also enabled Amnet to eliminate planned downtime for routine maintenance such as firmware upgrades, says Conway.

Later this year, IBM plans to release IBM SmartCloud Virtual Storage Center, an appliance-based virtualization layer that will provide services such as backup, load balancing and snapshots across applications and provision the right storage for each class of service, says Steve Wojtowecz, vice president of Tivoli storage software development at IBM.

Combining IBM's SAN Volume Controller storage virtualization platform with its Tivoli Storage Productivity Center management software and the Tivoli Storage FlashCopy Manager, the SmartCloud Virtual Storage Center will provide consistent performance on multiple vendors' storage arrays in data centers within 300 kilometers of each other, says Wojtowecz. But it doesn't currently support block storage, he adds.

Zadara Storage runs its storage virtualization layer on commodity servers in its own colocated cloud facilities, turning direct-attached disk drives into virtual SAN arrays. Noam Shendar, vice president of business development, says this gives those drives the performance, reliability and security of more ex-

PORTALS: DON'T TRY THIS AT HOME

CUSTOMERS PAY managed services providers such as NaviSite to mask the complexity of the technology they use. That's why it was worthwhile for NaviSite to devote a "significant amount of work and time" to building its AppCenter portal, says Chris Patterson, a product manager for NaviSite's cloud and hosting services.

NaviSite expanded its R&D team "significantly" to integrate its underlying platforms with AppCenter, he says. The project included coding to the APIs of vendors such as Actifio, which is one of the "disk-to-disk" platforms that NaviSite uses for backup and recovery. "We worked with Actifio to create simple menu options," says Patterson. "So the customer says, 'I want to back up using either this profile or that profile,' and they can see what they've done."

NaviSite has a staff of 30 to 40 people who continually revise AppCenter and add new features to it. "Anyone could write this," Patterson says. "But unless you're a service provider, unless this is something you [must provide], I wouldn't recommend it."

– ROBERT L. SCHEIER

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pensive SANs, and provides capabilities such as clustering using familiar SAN management tools.

Other vendors use a global file system to separate the details of where and how VMs or data are stored from the higher-level management objectives, such as meeting the terms of various service-level agreements (SLA).

Among the vendors coming the closest to offering combined server/storage management with this approach is Tintri, whose "VM-aware" storage appliances are designed to replace traditional storage units such as volumes, LUNs and files with virtual disks. Tintri's VMstore file system monitors and controls I/O performance for each virtual disk, communicating with the VMware vCenter to detect which virtual machines are active and how they are using storage. It then automatically chooses the best combination of storage for each virtual machine, including fast but expensive solid-state drives and slower but less costly disks.

Meanwhile, open-source vendor Red Hat claims that its Red Hat Storage Server, based on its GlusterFS file system, provides better scalability than rivals because it doesn't rely on a metadata server, more effectively distributes data and uses parallelism to maximize performance. Nutanix combines storage and server management, along with its own storage and performance management software, in a physical package that includes three to four x86 server nodes. Cisco takes a similar approach to combining computing, storage and networking with its FlexPod products.

Bridging Differences

One approach to cross-cloud storage management uses gateways that mask the differences among the APIs used by various cloud storage providers. TwinStrata's physical or virtual CloudArray (bundled with SANsymphony), for example, makes storage from any of 13 cloud providers appear as iSCSI devices to customers and applications. This allows connectivity and the use of a common management platform for functions such as disaster recovery and replication, says CEO Nicos Vekiarides.

Benefits plan administrator Rx-Strategies uses the TwinStrata gateway for cloud-based backup of its virtual machines and data. "On the outside, it looks like a SAN, which is old technology, but on the other side, it was actually part of the cloud, which enables us to transparently push our backup to Amazon or Rackspace," says senior developer Rick DeBay. In the future, he says he would like to be able to store data on more than one public cloud and easily move compute workloads to Amazon's EC2 public cloud and Amazon's S3 storage platform.

Other orchestration offerings are, however, limited to certain products or certain parts of the cloud.

CA Server Automation and CA Automation Suite for Clouds integrates with NetApp's OnCommand storage management software to provision NetApp storage for various classes of servers.

Caringo's CloudScaler virtualization layer provides automated, policy-based management — but only of storage, not virtual machines. Like many other orchestration platforms, it doesn't currently support the block-based storage used in low-cost, multitenant public storage clouds such as Amazon S3, but Caringo is working to offer that in the future.

Storage Automator, a storage service catalog and policy engine from iWave, currently supports only selected EMC and NetApp arrays, although broader support is due this year.

For the most part, [storage management tools] are quite expensive, complex to use and have mixed results with [other vendors'] products. ... The automation level of storage lags that of servers.

ANDREW REICHMAN, STORAGE ANALYST, FORRESTER RESEARCH

While it's the leader in server virtualization, VMware is working to differentiate itself from competitors such as Microsoft and its Hyper-V offering by "pushing to include more orchestration," says Reichman. With VMware vSphere 5.0, for example, it introduced storage profiles that let users map the capabilities of a storage system to a storage profile, helping to ensure each virtual machine uses the appropriate data store.

This summer, VMware acquired DynamicOps, whose architecture will allow vSphere and infrastructure administrators to model infrastructure services. This will enable the policy, governance and self-service management capabilities in vSphere to be extended to other hypervisors, hardware and clouds, according to a blog post by Ramin Sayar, VMware's vice president and general manager for cloud infrastructure and management.

Function-specific Offerings

Many vendors' offerings are focused on areas such as data protection and disaster recovery, which were the most common needs cited by VMware users in a July 2012 survey conducted by the Wikibon technology analysis website. Again, many tools are limited to specific vendors' products or storage protocols.

Actifio, for example, tackles backup, disaster recovery and business continuity with its Protection and Availability Storage (PAS) appliance, which virtualizes both storage and storage functions such as copy, store, move and restore. But the PAS appliance supports only Fibre Channel-attached storage, such as SANs, and only disaster and recov-

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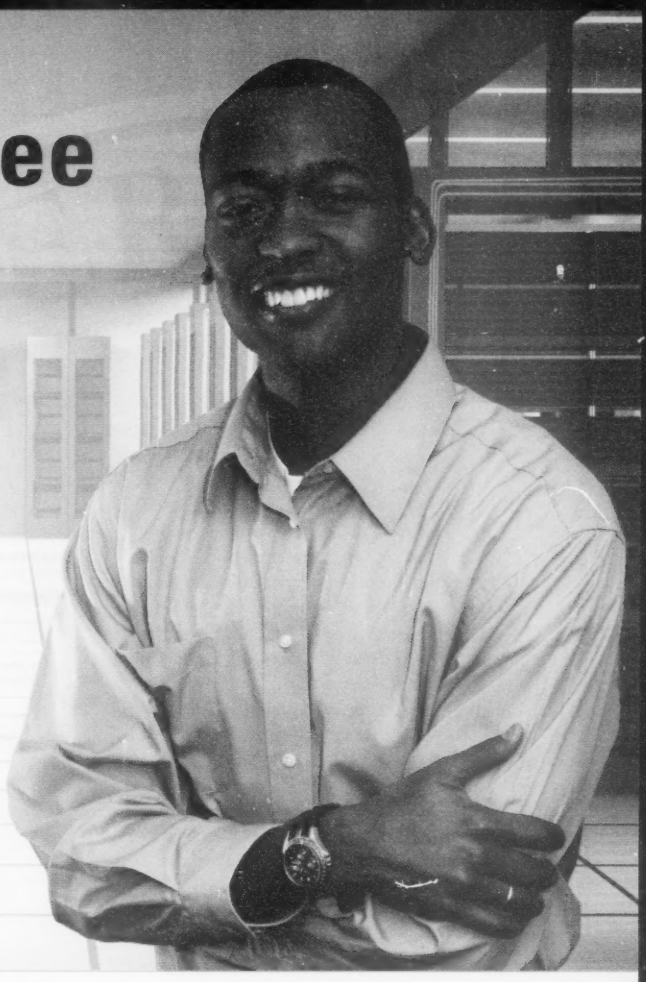

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6 TOUGH QUESTIONS

When choosing a storage orchestration tool, Greg Schulz, senior adviser at the Server and StorageIO Group, recommends asking the following questions:

1. **Does it enable the setup and scheduling of snapshots, replication, backup and other functions that ensure data availability?**
2. **How does the platform coordinate with other technologies, such as dynamic path management, that provide load management as application loads change?**
3. **How will the platform's performance and price be affected as your company adds more servers, storage and networks?**
4. **Will it be easy to install the vendor's system and integrate it into your company's environment?**
5. **How well does the vendor's platform integrate with your existing service catalog?**
6. **Can the platform recognize and comply with your policies on security, regulatory compliance and quality of service?**

– ROBERT L. SCHEIER

ery, not the dynamic reprovisioning required to maintain the performance of production applications.

Even if this creates a stand-alone silo of tools and data for backup and recovery, that's an improvement over the multiple silos (and multiple copies of data) many companies use for anything from testing to disaster recovery or data analytics, says Andrew Gilman, senior director of global marketing at Actifio. He also says Actifio's globally deduplicated object-based file system reduces costs by storing and moving only changes to data.

VirtualSharp Software says its ReliableDR "goes into the different layers of virtualization inside the cloud" and uses the APIs provided by storage vendors to create runbooks (defined sets of operations) to execute and verify disaster recovery and failover. However, it does this only for applications running on VMware hypervisors, and only for applications, not for the data they use.

Also, the tool supports only clouds running within corporate data centers, because, says CEO Carlos Escapa, "the market is so huge behind the firewall and the protection mechanisms are lacking." He adds that the fact that ReliableDR is capable of running multiple disaster recovery tests per day more than makes up for its lack of broader management capabilities.

Symantec's Virtual Business Services doesn't handle VM management or even storage provisioning such as zoning SANs or creating LUNs, says senior director of product management Douglas Fallstrom. It instead allows customers to define dependencies among the tiers of an application stack (including VMs and their associated storage) to better understand how the stack responds to the failure of one component. This helps ensure that the terms of SLAs for the storage tier are set properly and that performance can be measured.

Continuity Software's recently announced Availability Cloud/Guard aims to improve reliability by detecting problems such as situations where "clustered servers can't see new storage" because of a failure to map the new storage device to all the appropriate servers. That's a problem an administrator often wouldn't be aware of until the server "tries to use the storage [and] fails," says CTO Doron Pinhas. Cloud/Guard helps find such problems by comparing a customer's deployment with 6,000 deployment scenarios from the vendor's customers to "observe your effort to build the environment ... and gently steer [the customer] in the right direction," he says.

Neverfail says its software provides "application-aware" disaster recovery and high availability for applications in hybrid public/private clouds. It does this, says CTO Paddy Falls, by intercepting file system updates from applications and storing a copy of the application on other servers on-premises or in the cloud. It allows the high-availability or disaster recovery server to run on a different platform than the production server, he says, and to mix physical and virtual servers or different hypervisors. The software doesn't, however, support object-based storage services.

Some tools focus on specific applications. Sanbolic recently announced the first public cloud support for Sanbolic AppCluster, a module within its Melio data management software that provides failover/migration, load balancing and quality-of-service support for Microsoft SQL Server.

As more routine storage functions are automated, and as businesses focus more on service levels rather than on the mundane tasks required to achieve them, the task of storage administration will move "from a pure storage administrator to maybe a DBA or maybe a policy administrator," Reichman predicts. "Instead of storage administrators doing only storage, expect to see more application administrators managing the infrastructure, [with] some of what was the server and storage team moving into those application or workload teams."

However, says Shahin Pirooz, CTO at hosted services provider CenterBeam, "you still need a core team of people to configure the orchestration" and build the infrastructure for higher-level administrators to manage.

Customer demands will eventually force vendors to provide more complete orchestration. Until then, CIOs who are evaluating storage management tools should find out which specific storage and hypervisor platforms the vendors support, determine which functions or applications they focus on and, above all, assess the total cost of ownership and ease of use of their offerings.

As Conway says, "I'd rather have three highly capable and easy-to-use tools than one tool that doesn't do as much as the three and is harder to manage." ◆

Scheier *is a veteran technology writer. You can contact him at bob@scheierassociates.com.*

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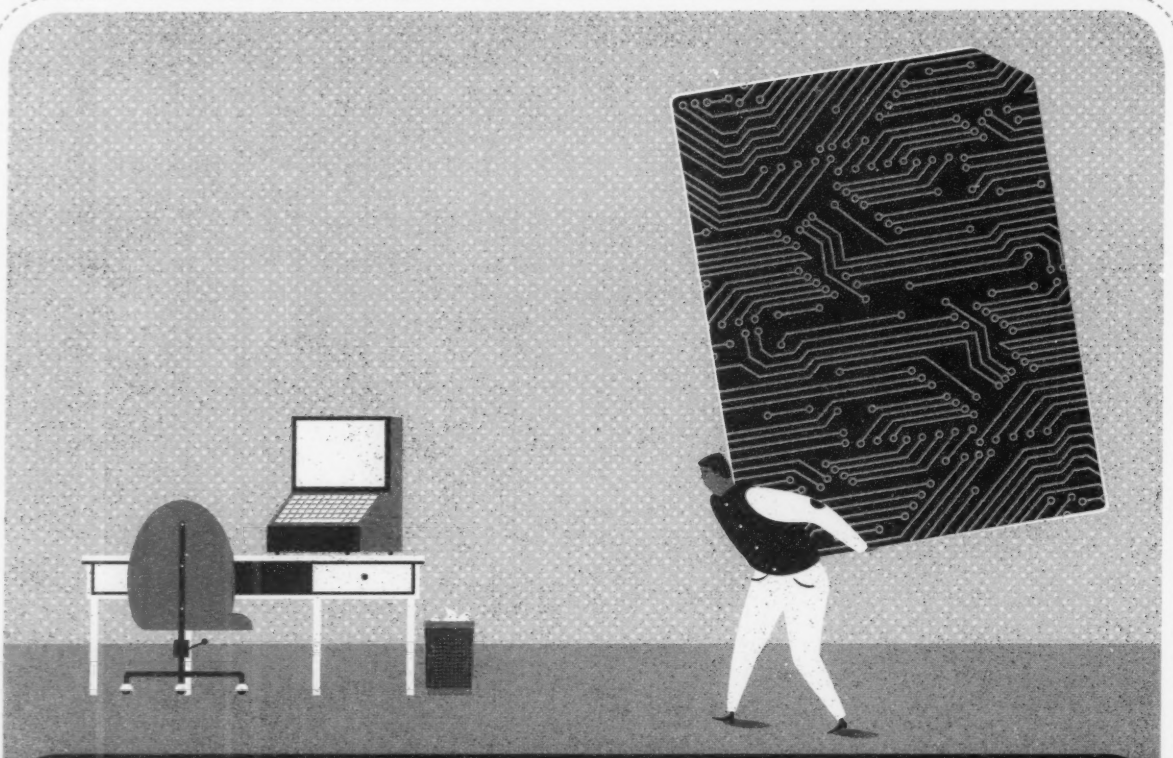


STORAGE, Supersized

Storage systems are becoming storage computers as vendors push functionality downstream. BY STACY COLLETT

ON THE FIRST FULL DAY of VMworld in San Francisco in August, five-year-old storage vendor Scale Computing launched a new storage appliance that eliminates the entire I/O storage network that resides between servers and storage. Instead, the appliance uses powerful processors that are capable of hosting multiple virtual machines in the same storage box. The appliance requires no virtualization software and no external storage, which could cut storage costs by as much as 75% for small and midsize businesses with limited resources and storage expertise.

Some industry watchers call it a breakthrough. Others call it an expected progression in storage architecture. But all agree that the evolution of storage from basic systems to high-powered storage computers is a trend that's taking hold at organizations of all sizes.

"They're the first one I've seen that's done something like that," says Dick Csaplar, an analyst at Boston-based Aberdeen Group, referring to Scale Computing's "collapsed" architecture, which combines servers, storage and virtualization in one appliance. "It seems fairly straightforward. It's one of those 'Why didn't it happen earlier?' types of questions."

In fact, many veteran and startup storage vendors have been plotting moves into high-powered storage computers for some time, as more functions are being driven down into storage systems.

One of the key reasons why it's possible to move computing power down into storage is the emergence of scale-out architec-

DAWID RYSKI ILLUSTRATION

tures, which can bring a lot more CPU, memory and networking to the storage level. Traditional storage architectures, with their fixed amounts of CPU, memory and networking, weren't designed to host applications natively on storage systems. Today, the emerging scale-out architecture lets users add many storage systems to an existing infrastructure and scale up not just capacity, but also performance, CPU, memory and networking equally.

Advances in processing power have also prompted the move to storage computing. With 16-core processors, for instance, systems have "incredible amounts of computing power. Utilizing some of that power for things other than straight application processing is coming," Csaplar says.

Server virtualization has also pushed traditional storage systems to the tipping point, with sometimes 20 to 30 servers virtualized onto one server. "So now storage administrators are faced with a tremendous load coming into one storage system," says Hu Yoshida, CTO at Hitachi Data Systems. "That has increased the demand for I/O processing."

Staking Their Positions

Storage giant EMC is working on next-generation scale-out capabilities at the storage level, but the vendor doesn't have a new product to announce yet. "It's certainly an area of interest," says Sam Grocott, vice president of marketing. "From an industry standpoint, I think everybody is looking at that. We have CPU cycles and cores and a lot more memory that is available for not just storage tasks today, but now for application use cases as well."

Hitachi Data Systems has been steadily moving toward powerful storage computing since 2000, Yoshida says. Today, its Virtual Storage Platform can move data to high-performance storage when an application needs it and move it to lower-class storage when performance is no longer required.

"It's not just a storage computer — it's a hybrid multiprocessor," Yoshida says. "We also do that in our high-performance NAS product."

The next step will be "unification," he adds. "In our midrange product, we've added an optic file system [so] users can do file as well as block processing. Our file system is built around an object architecture, so I can do a query against the metadata and find things quickly. This is how we combine hardware and CPUs running software to speed up the process." Hitachi included that file system in its Unified Storage System in April.

"We're going to see more hybrids from Hitachi," says Andrew Reichman, an analyst at Forrester Research. "They've got the tools, but they're slow to market. They take their time but build something that is very well engineered."

Nearly a dozen startups have entered the market, Reichman says. Nutanix, for instance, has rolled out a server/storage hybrid designed to be scaled out, highly automated and easy to use. Nimble Storage offers a next-generation hybrid combination of disk/solid-state drive. Tegile Systems, MorphLabs, Tintri, Pivot3 and Astute Networks also offer one-stop storage computing boxes.

Intricate Challenges

High-performance storage computing requires expertise in servers, storage and applications. Many vendors will have to forge partnerships to be successful.

"Those three pieces are key to [making] this a scalable model," Grocott says. "The storage [vendors are] going to have to have strong partnerships with the application players, because they need to become aware that [applications] live on storage and are not going through traditional networks. But also you create that scalable infrastructure via hypervisors — whether with Microsoft, VMware or someone else — to house these multiple applications within the storage infrastructure."

He does acknowledge that creating scalable infrastructure via hypervisors could add a layer of complexity and expense.

"It's a constant trade-off" when it comes to choosing among high performance, easy scalability and lower costs, Grocott says. "I think that's the piece that needs to evolve the most — making sure the application [vendors] are aware of this new storage environment and we partner together to figure out what's the right model, both from an integration and economic standpoint."

Right now, storage computing appliances are being marketed to midsize companies. "It's simplification for the midsize enterprises who are just getting hammered with all the complexity of the big guys and no resources to deal with it," Csaplar says. But large enterprises will likely benefit most from the highly optimized architecture to deliver a handful of applications that are virtualized on storage, and they'll be willing to pay extra for better performance, Grocott adds.

"You'll see different models emerging for different marketplaces, which is appropriate," Csaplar says. "We're still kind of looking for that ultimate solution, and we'll need a lot of swings and misses before somebody hits the ball out of the park." ◆

Collett *is a* Computerworld *contributing writer. You can contact her at stcollett@comcast.net.*

Hu Yoshida, CTO, Hitachi Data Systems

MIX AND MATCH

MORE COMPANIES than ever before are blending cloud and on-premises storage, says Dick Csaplar, an analyst at Aberdeen Group. On-premises systems are "fast, immediate, close by," he notes, adding that they have "very little latency because you're not dealing with a WAN — just a LAN."

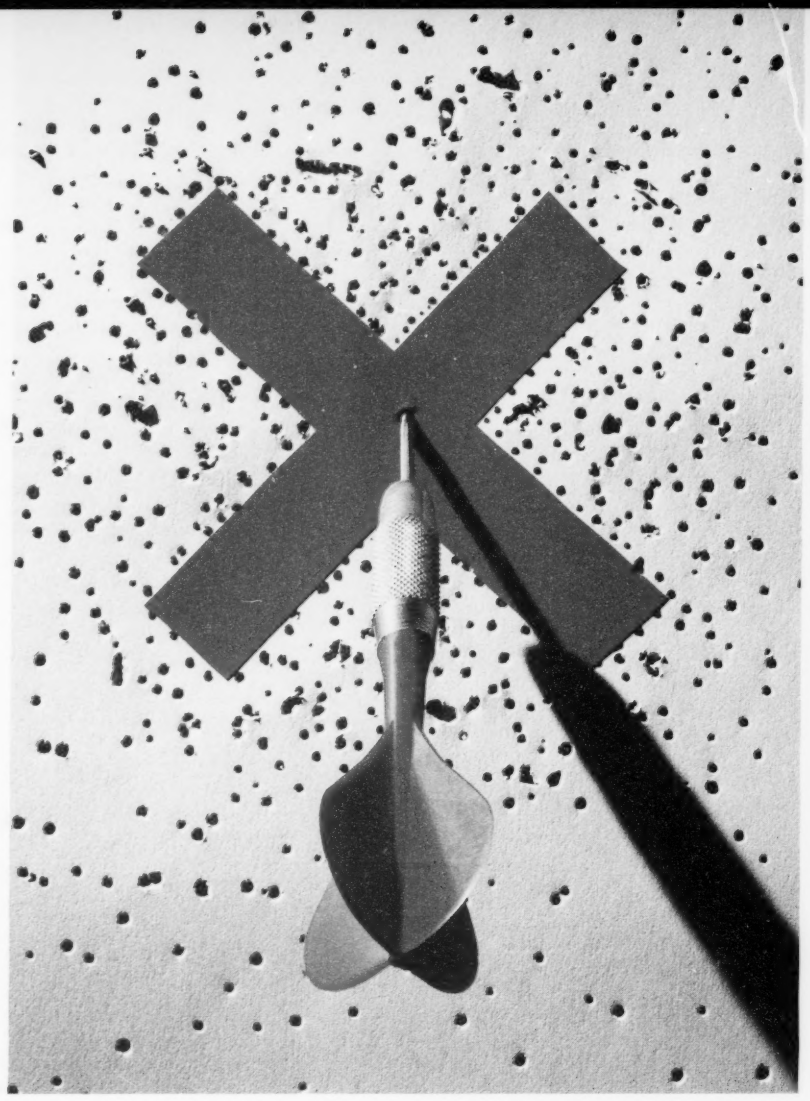
But as the data ages — and in some cases, before it's even archived — "you can relocate it in the cloud and take advantage of the low cost of cloud storage, but still have direct access to the data" even if there's a delayed response, says Csaplar. Red Hat did this with its hybrid cloud storage architecture after acquiring Gluster, an open-source storage software company, in October 2011. Swedish vendor CompuVerde has a similar offering.

"They all have different variations on the theme of what [storage] is on-premises versus what's in the cloud," Csaplar adds. "But this link of making your storage continuous across both the cloud and on-premises is a trend I think we're going to see a lot more of as well."

— STACY COLLETT

Contrary to popular opinion, **you don't need a huge budget** to get started.

BY ROBERT L. MITCHELL



PREDICTIVE ANALYTICS GO TO WORK

THE ORLANDO MAGIC'S analytics team spent nearly two years honing its skills on the business side.

"Eighteen to 20 months ago, we knew virtually nothing about predictive analytics," says Anthony Perez, director of business strategy for the National Basketball Association franchise. While his team members were in fact working on predictive analytics well before that, Perez adds, their tools weren't powerful enough to give them the insights they needed, and the group had to scale up its efforts. So Perez brought in new, more powerful software from SAS and began climbing the learning curve.

Today, the established analytics practice helps to optimize ticket sales and provides the coaching staff with tools that help predict the best lineups for each game and identify players that offer the best value for the money.

TOOGA / GETTY IMAGES

9 STEPS to Predictive Success

Follow these best practices to ensure a successful foray into predictive analytics.

1 DEFINE THE BUSINESS PROPOSITION.
What is the business problem you're trying to solve?

2 RECRUIT ALLIES ON THE BUSINESS SIDE.
Having the support of a key executive and a business stakeholder is crucial.

3 START OFF WITH A QUICK WIN.
Find a well-defined business problem where analytics can deliver measurable results.

4 KNOW THE DATA YOU HAVE.
Do you have enough data – with enough history and enough granularity – to feed your model?

5 GET PROFESSIONAL HELP.
Creating predictive models is different from traditional descriptive analytics, and it's as much of an art as it is a science.

6 BE SURE THE DECISION-MAKER IS PREPARED TO ACT.
An action plan alone isn't enough – someone has to carry it out.

7 DON'T GET AHEAD OF YOURSELF.
Stay within the scope of the defined project, even if success breeds pressure to expand the use of your current model.

8 COMMUNICATE THE RESULTS IN BUSINESS LANGUAGE.
Talk about things like revenue impact and fulfillment of business objectives.

9 TEST, REVISE, REPEAT.
Conduct A/B testing to demonstrate value. Present the results, gain support, then scale out.

SOURCES: GUY PERI, P&G; GEORGE ROUMELIOTIS, INTUIT; DEAN ABBOTT, ABBOTT ANALYTICS; ERIC SIEGEL, PREDICTION IMPACT; JON ELDER, ELDER RESEARCH; ANNE ROBINSON, THE INSTITUTE FOR OPERATIONS RESEARCH AND THE MANAGEMENT SCIENCES.

Perez's team began by using analytic models to predict which games would oversell and which would undersell. The box office then used that information to adjust prices to maximize attendance — and profits. "This [past] season we had the largest ticket revenue in the history of our franchise, and we played only 34 games of the 45-game season due to the lockout," he says.

Now those models are run and prices are fine-tuned every day. Ask how the models are used to predict the best player matchups and game strategies, however, and Perez is less forthcoming. "That's the black box nobody talks about," he says.

Although it's still fairly early going, other organizations are beginning to embrace predictive analytics, the forward-looking data-mining discipline that combines algorithmic models with historical data to answer questions such as how likely a given customer will be to renew a season ticket. The models assign probabilities to each person. Armed with that data, the business can prepare to take action. Additional analysis can then be applied to predict how successful different courses of action will be.

The use of predictive analytics is common in industries such as telecommunications, financial services and retail, says Gareth Herschel, an analyst at Gartner. "But overall, it's still a relatively small percentage of organizations that use it — maybe 5%."

Nonetheless, interest is high in organizations that are still focused on historical "descriptive analytics" and in businesses that are expanding the focus of established predictive analytics practices beyond traditional niches such as marketing and risk management. Analytics models are being used to predict website click-through rates and help HR anticipate which employees are likely to leave the company. They're also used to optimize help desk call routing, by determining which agent is likely to do the best job of answering a given user question.

"There's more interest because there's more data," says Dean Abbott, president of consultancy Abbott Analytics. "The buzz is about momentum. People are saying, 'This is something I need to do.'"

But you have to walk before you can run, and with its data-heavy demands, predictive analytics isn't something to take up lightly or haphazardly. We asked businesses that are new to the game, as well as seasoned veterans, to share their experiences.

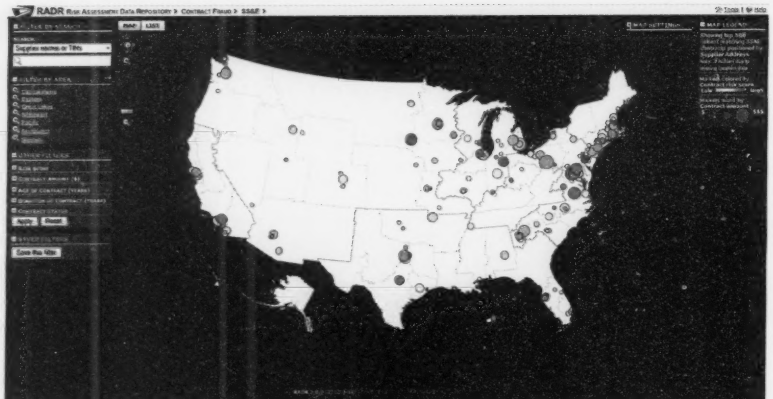
> **We're using advanced analytics to be more forward-looking and to manage by exception.**
>
> **GUY PERI,** PROCTER & GAMBLE

Making the Business Case

Consumer products company Procter & Gamble makes extensive use of analytics to project future trends, but it wasn't always that way, says Guy Peri, director of business intelligence for P&G's Global Business Services organization. "This used to be a rearview-mirror-looking company," he says. "Now we're using advanced analytics to be more forward-looking and to manage by exception." Than means separating out the anomalies to identify and project genuine trends.

P&G uses predictive analytics for everything from projecting the growth of markets and market shares to predicting when manufacturing equipment will fail, and it uses visualization to help executives see which events are normal business variations and which require intervention.

The place to start is with a clear understanding of the business proposition, and that's a collaborative process. "Be clear on what



» Heat maps such as this one, used at the U.S. Postal Service, make data much more actionable than raw numbers alone, say predictive analytics teams.

the question is and what action should be taken" when the results come back, Peri says.

It's also important to keep the scope focused. Mission creep can destroy your credibility in a hurry, Peri says. Early on, P&G developed a model to project future market shares for regional business leaders in a line of business he declined to identify. It was successful until the company tried to use the same model to help other business leaders.

The other leaders required a more granular level of detail, but Peri's group tried to make do with the same model. "The model became unreliable, and that undermined the credibility of the original analysis," which had been spot-on, he says.

New users need to take several steps to get started with predictive analytics, says Peri. They should hire a trained analyst who knows how to develop a model and apply it to a business problem, find the right data to feed the models, win the support of both a business decision-maker and an executive sponsor in the business who are committed to championing the effort — and take action on the results.

"Notice I didn't mention tools," Peri says. "Resist the temptation to buy a million-dollar piece of software that will solve all of your problems. There isn't one." And, he adds, you don't need to make that kind of investment for your first couple of projects. Instead, train staffers in advanced spreadsheet modeling.

"All of this can be done with Excel," says Peri. Only when you're ready to scale up do you need bigger, platform-level types of tools, he says.

Keeping Users Close

Bryan Jones started on a shoestring budget — but that's not why his first effort at predictive analytics failed. Jones, director of countermeasures and performance evaluations in the Office of the Inspector General at the U.S. Postal Service, wanted to help investigators determine which healthcare claims were most likely to be fraudulent.

After eight months, he had a working model, but the independent analytics group working on the project wasn't fully engaged with the department that would be using the tool. As a result, the raw spreadsheet output was largely ignored by investigators.

Fortunately, Jones' group had the support of the inspector general. "You're dead in the water if you don't have support from the top," he says.

The second time around, Jones hired a consultant to help with modeling and data prep, and embedded an analyst within the group that would be using the results.

And they made those results more "real" to users. For an investigation of contract fraud, for example, his team placed the results in a Web-based interactive heat map that showed each contract as a circle, with larger circles representing the biggest costs and red circles being the highest risks for fraud (see map, at left).

Investigators could click on the circles to see the details of the contracts and related contracts that were at risk. "That's when people started to notice that we really had something that could help them," says Jones.

Jones' advice: Get close to your customer, get professional help building your first model, and present the results in a compelling, easy-to-understand way. "We didn't have the right people or expertise to begin with. We didn't know what we didn't know," he says, so he turned to an outside data-mining expert to help with the models. "That relationship helped us understand why we failed and kept us from making the same mistakes again," Jones says.

Overcoming Business Skepticism

While hiring a consultant can help with some of the technical details, that's only part of the challenge, says John Elder, a principal at Elder Research, a consultancy that worked with Jones and his team. "Over 16 years, we have solved over 90% of the technical problems we've been asked to help with, but only 65% of the solutions have gone on to be implemented."

The problem, generally, is that the people that the model is intended to help don't use it. "We technical people have to do a better job making the business case for the model and showing the payoff," Elder says.

Persuading decision-makers to use the results can be as difficult as getting them to go along with the project in the first place, because the predictions may be the exact opposite of what their business intuition tells them, says Anne Robinson, president-elect of the Institute for Operations Research and the Management Sciences (Informs), a professional society for business analytics. "As you get more involved with analytics, it becomes counterintuitive. But it's those deviations from what you're doing that bring the rewards, because when the results are intuitive, you find that most people are already doing them."

Several years ago, Cisco Systems created

> **You're dead in the water if you don't have support from the top.**
>
> **BRYAN JONES,** INSPECTOR GENERAL'S OFFICE, U.S. POSTAL SERVICE

"propensity to buy" models that were designed to help calculate the probability that customers would buy this quarter, next quarter or never. The models cover every product in every sales territory. The salespeople felt they already knew what some of the people identified by the model were going to buy, so Cisco excluded those sales when calculating the return on its effort. "The first year we did it, we generated $1 billion in sales uplift," says Theresa Kushner, Cisco's senior director of customer and influencer intelligence. "We had an experience to line up against what they thought they believed."

Ultimately, predictive analytics is forcing a showdown between data-driven and intuition-based decision-making, says Eric Siegel, president of Prediction Impact, an analytics training firm and conference organizer. "That's the big ideological battle. It's a religious debate."

Data: Getting to Good Enough

On the technology side, both building the model and preparing the data can be stumbling blocks. Predictive analytics is an art as well as a science, and it takes time and effort to build that first model and get the data right, says Abbott. "But once you build the first one, the next one is much less expensive to model" — assuming you're using the same data. Analysts building an entirely different model with new data might find the second project just as time-consuming as the first. Nonetheless, he says, "the more experience one gains, the faster the process becomes."

Data preparation issues can quickly derail a project, says Siegel. "Software vendors skip that point," he says, noting that "all of the data in a demo has already been put into the correct format. They don't get into it because it's the biggest obstacle on the technical side of project execution — and it can't be automated. It's a programming job."

When Perez started the Orlando Magic's predictive analytics initiative in 2010, he miscalculated the time it would take to prepare the data. "All of us were thinking that it would be easier than it was," he says. Pulling data from Ticketmaster, concession vendors and other business partners into a data warehouse took much longer than anticipated. "We went almost the entire season without a fully functional data warehouse. The biggest thing we learned was that this really requires patience," he says.

"Everyone is embarrassed about the quality of their data," says Elder, but waiting until all of the data is cleaned up is also a mistake. Usually, he says, the data that really matters is in pretty good shape.

Iterate First, Scale Later

At Intuit, every project starts small and goes through cycles of improvement. "That's our process: iterative and driven by small scale before going big," says George Roumeliotis, data science team leader. The financial services company started using predictive analytics to optimize its marketing and upsell efforts, and now focuses on optimizing customers' experiences with its products.

Intuit developed predictive task algorithms to anticipate how users will categorize financial transactions in products such as Mint and QuickBooks. Based on the results of those algorithms, Intuit applications make suggestions as users enter new transactions. They also anticipate questions users might have and proactively provide content and advice that could help them.

"Start with a clearly articulated business outcome, formulate a hypothesis about how the process will contribute to that outcome, and then create an experiment," says Roumeliotis. Through A/B testing, analysts can gain the confidence of business leaders by creating parallel business processes and demonstrating a measurable improvement in outcomes.

Just be sure to start by choosing an existing business process that can be optimized with minimal risk to the business, he advises. Customer support, retention and user experience are great places to get started.

While predictive analytics projects can require a substantial investment up front, studies indicate that they can deliver positive returns on investment, as Cisco's experience shows. Ultimately, even small-scale projects can have an enormous impact on the bottom line. "Predictive analytics is about projecting forward and transforming the company," says Peri.

The risks are high, but so are the rewards, says Robinson. "Take it to the end," she says. "Be successful. And act on what you learn." ◆

Security question #17

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Security Manager's Journal

MATHIAS THURMAN

Trouble Ticket

At issue: A consulting firm that specializes in penetration testing finds several vulnerabilities.

Action plan: Plug holes and write new procedures – and find out why no one on the security team noticed any suspicious activity.

I Hired a Hacker

Some cleaning up is needed after a third party's penetration testing uncovers some disturbing findings.

A **VERY IMPORTANT** piece of my budget is the quarterly allotment for security assessments. I usually focus on physical penetration testing of our major facilities or assessments of critical applications or our own products. This quarter, though, I decided to hire a hacker.

While I'd like to think that we have a somewhat hardened shell, I know our infrastructure is not 100% secure. The only ways to discover where your vulnerabilities lie are to run an internal assessment or, better yet, hire a hacker to do it for you — or at least a consultancy that specializes in penetration testing.

I figured we would get a more complete picture with a truly independent assessment from a third party. I imposed only one constraint on the consultant we hired: no denial-of-service attacks. With an outside firm, I could also test my security team's effectiveness at detecting suspicious activity, so I kept the engagement stealthy; only a few trusted individuals in the IT department knew about it. Another benefit of this approach is that we would get a better idea of how well our data leak prevention and security incident and event management systems were protecting us.

Other than a list of critical applications that I wanted assessed, I gave no detailed information to the consultants. I wanted them to hack us the same way a determined individual or organization would do it.

When the report came back two weeks later, one major finding was the discovery of an external DNS server that was advertising our internal address space. What's more, this DNS server was configured to allow anyone to transfer the zone information, including the mapping of our internal infrastructure and naming conventions. This information could be used by a hacker to, among other things, map out our internal network and then focus on some juicy targets.

Another problem uncovered was the potential for unauthorized access of our infrastructure through a series of vulnerabilities. One consultant discovered a SQL injection vulnerability on an Internet-facing application and was able to issue a SQL query to obtain the password hash for a system account on one of our application servers. The password was cracked in six seconds.

That password was then used to access Microsoft Outlook Web Access, and the hacker/consultant was able to log in with the application service account. Service accounts should, as a matter of practice, never have email associated with them.

In any event, the consultant was able to enumerate our entire corporate directory and then choose the name of an employee who worked in the mailroom. He pulled as much information about that person as he could from the Internet, including home address, phone number and personal email address. Posing as the mailroom employee, the consultant called our help desk (he found the number on our corporate website). To validate the "user," the help desk technician only asked for his office extension. The hacker provided the number, and the tech cheerily reset the "user's" email password and issued him a temporary RSA SecurID passcode that was then used to log in to our employee VPN portal. From there, the hacker had access to our company intranet and various corporate applications.

As you can imagine, I have my work cut out for me. We need to establish new help desk procedures for validating employees, reconfigure a DNS server, plug SQL injection holes, incorporate two-factor authentication for Microsoft Outlook Web Access and review service accounts. Lastly, I need to figure out why my security team didn't detect any of the consultant/hacker's activity. ◆

This week's journal is written by a real security manager, **"Mathias Thurman,"** *whose name and employer have been disguised for obvious reasons. Contact him at mathias_thurman@yahoo.com.*

JOIN IN the discussions about security! **computerworld.com/blogs/security**

"To discover where your vulnerabilities lie, you can run an internal assessment or hire a hacker.

made in germany

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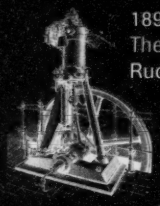
Aspirin
Arthur Eichengrün

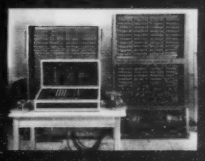
1897
The diesel engine
Rudolf Diesel



1928
The first pregnancy test
Selmar Aschheim

1938
Nuclear fission
Otto Hahn

1941
The first computer
Konrad Zuse



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PAUL M. INGEVALDSON

IT Must Use Metrics to Move Out of the Shadows

HERE'S A PROBLEM FOR IT LEADERS: Many users feel that IT is a black hole that things go into but never come out of. It doesn't help that many IT departments like it that way and believe the less scrutiny, the better.

IT must be as willing to accept blame when at fault as it is to welcome praise when successful.

That's a dangerous attitude. If IT wants to be a great enigma, then it must accept the consequences: lack of respect, mistrust of intent and difficulty in entering into the mainstream of the company. If none of that sounds good, then IT must open itself up and be accountable for its actions. It must be as willing to accept blame when at fault as it is to welcome praise when successful. In short, IT must start acting like every other department.

The best way to eliminate the veil of secrecy that has fallen over most IT activities is to develop a reporting methodology that communicates the status of projects to everyone in the corporation. When I was a CIO, we published a monthly report listing projects: approved, completed, in process and yet to be started. We included the original cost estimate, an estimated completion date and any changes that caused the initial estimates to be adjusted. We explained whether the variations were due to errors by IT in the initial estimate, accommodations of new requests by the users (scope creep) or new findings during development.

We published this report on the corporate intranet for everyone to see, highlighting all the major changes in yellow so no one could miss them. In turn, those major changes were discussed in detail at the next officers' meeting. This way there were no surprises on major projects, and the corporate officers could prepare for any ramifications resulting from the delay of a major implementation.

All of this meant that discussions of IT progress were routine. Users across the company became very familiar with all of our major projects and their status. No one could ever say they were blindsided by delays in project completion.

Our intranet reports set the agenda for meetings of the IT steering committee, which discussed project progress, significant cost issues raised by new projects and any other IT issues that rose to the level of the officers' concerns. The committee might modify a project's priority to accommodate a change in the business, government requirements or legal issues. All of this kept the officers engaged in the IT agenda and partly responsible for its actions — as they should be, since users ultimately own IT projects.

Growing Up

Metrics are an important step in the maturation of any IT department. Knowledgeable executives always know the numbers that are critical for the company; numbers are the language of business. Alone in this world of business, many IT executives speak in generalities about their department and neglect to document the critical numbers that should point out the IT department's successes. How can they not know the average response time for critical online systems or the mean time to resolve online problems for users?

CIOs who can quantify their operations in business measurement terms have a much better chance of being accepted by the community of C-level officers, who thrive on this kind of information. It will make IT look much more like an actual department rather than a group that relates more to its technology than to the corporation. ◆

Former Ace Hardware CIO **Paul M. Ingevaldson** is a *Computerworld* columnist and author of the book *The 9½ Secrets of a Great IT Organization*, from which this article was adapted.

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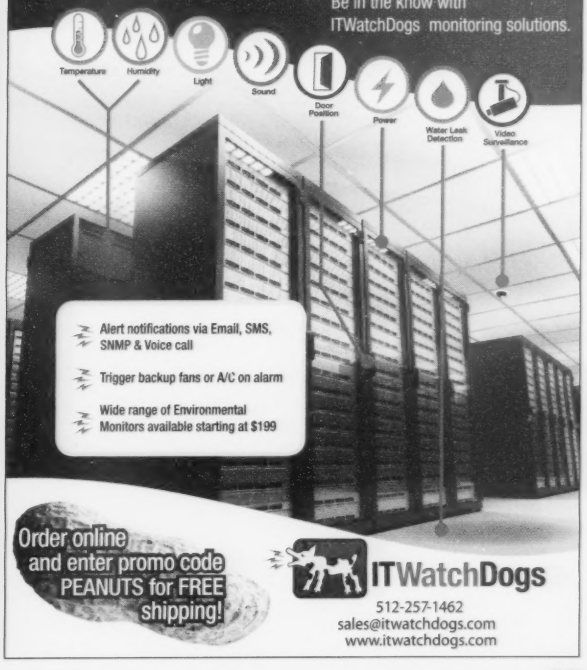

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Career Watch

Noncertified Skills Still Have Edge in Pay Premiums

FOOTE PARTNERS continues to track a disparity in the premiums companies are willing to pay for certified vs. noncertified IT skills. In its latest quarterly IT Skills and Certifications Pay Index, Foote reports that in the second quarter, bonuses for noncertified skills were averaging about 8.6% of base salary, while those for certified skills languished at about 6.5%. What is striking is that this is roughly the reverse of the situation in late 2004, and it has now been six years since noncertified skills gained the upper hand. In his report, chief analyst David Foote goes into great detail about what has driven this change. His analysis, which can't be adequately summarized here, says in part that "more and more employers have chosen to value employees more highly based on their level of experience and demonstrated expertise regardless of whether they have earned available certifications to support what they can do with their skills and expertise." **Here's a look at what has happened over the past six months in broadly defined skills areas:**

Changes in Skills Premiums Over Six Months

Noncertified IT Skills		IT Certifications	
Database	11.9%	Application development/ programming languages	4%
Messaging and communications	6.1%	Database	4%
Application development	3.6%	Systems administration/ engineering	3.9%
Management/ methodology process	3.1%	Web development	0%
Systems/ networking	2.2%	Information security	-1.6%
Operating systems	1.3%	Architecture/project management/process	-4.9%
SAP and enterprise business applications	0.8%	Networking and communications	-8.4%
Web/e-commerce	-3.2%	Foundation level and training	-13.3%

SOURCE: FOOTE PARTNERS' IT SKILLS AND CERTIFICATIONS PAY INDEX, Q2 2012

ASK A PREMIER 100 IT LEADER

Raman Mehta

The CIO and chief process architect at EWIE answers questions about **working under a bad boss** *and more.*

I like my company. I like my job. I hate my boss. He's always covering his you-know-what and taking credit that he doesn't deserve. So far I've told myself that two out of three (company and job) isn't bad, but I think I'm going to need a better way to cope. Any advice? Try to be visible a layer above your boss, and seek recognition outside of your job. There are many ways to achieve this; writing for internal newsletters and speaking at industry seminars are two. Some organizations offer formal skip-level meetings, where you can network with your boss's superiors. That makes it easier to move to a different group. You also need to do an effective job of managing your boss; upward communication is an art. Have an open dialogue and make your boss understand that recognition is a major motivation factor for you.

If you have a question for one of our Premier 100 IT Leaders, send it to **askaleader@computerworld.com,** and watch for this column each month.

I was on an extended maternity leave in 2010. I don't like to disclose this to prospective employers because I'm concerned about possible gender prejudices. How can I explain this résumé gap without deception while still protecting my privacy? What CIOs care about most when hiring is potential value to the organization. I like to see evidence that someone with a résumé gap remained connected and stayed abreast of developments. Most employers would feel the same. It's very common these days to see gaps due to rightsizing, entrepreneurial pursuits or other reasons. Be honest if the topic comes up, and highlight some of your business knowledge and skills that have no impact from the extended leave.

Having worked in IT in two dying industries (newspapers and U.S. manufacturing), I figure I should set my sights on a sector with a brighter future. What seems promising? First of all, the manufacturing industry, especially in the high-tech industrial manufacturing sector, has shown a lot of promise in the past couple of years. The publishing industry is undergoing a makeover, with a focus on delivery through mobile applications. IT plays a very important role in transforming such industries, and that sort of experience is quite valuable to other up-and-coming industries, such as alternative energy, smart utility grids and bioengineering. One area with promise is the market made up of companies that bring social media into an enterprise. With your prior stint in publishing, mobile advertising on social media may be a smart move.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below:
Product Manager, (NY, NY) **#1615.3904**: Take responsibility for Google products from conception to launch. Exp incl: design, building, & mgmnt of payment solutions for ecommerce prod; payments process &tech, & cardholder life cycle mgmnt; payment ntwrks & ISO-8583 specs; ecommerce tech; syst design; UML methodology; process map; payment trans process & ntwrk compliance; & gather reqmnts & docs.
SW Eng Positions (NY, NY): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. incl:
#1615.3925: distrib syst design; perf analysis; data model & analysis; & large scale sw eng'g.
#1615.2262: storage syst; design, dvlpmnt & release of web appl; binaries & distrib syst; & proj mgment.
#1615.2202: sw eng'g or proj leadership; C &/or C++; Python; design of large scale distrib syst; & multithread.
Staff Software Engineer Position (NY, NY) **#1615.3306** design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. incl: HTTPS; SSL/TLS implement; C++; Linux; dev sw on embed syst; & security syst.

Research in Motion Corporation (US), Redwood City, CA, positions are available:
CA7016 - Sr. Software Developer, Advanced Tooling

Research in Motion Corporation (US), Bellevue, WA, positions are available:
WA7017 - Software Developer

Submit resume to Research in Motion Corporation (US), to P.O. Box 141394, Irving, TX, 75014-1394 U.S.A., referencing appropriate job title and requisition number.

Computer Professionals for MD based IT Firm: Sr.Software Engineer: Dsgn, dvlp, coordinate & implement adv s/w module components in complex computing environments using latest tools & technlgs. Manage backup & security. Anlyz user needs & dvlp s/w solutions. Dsgn & customize s/w as per the reqmnt. Sr.Programmer Analyst: Dsgn, dvlp, plan, coordinate & implement adv s/w module components in complex computing environments using latest technlgs & tools. Evaluate the organizat;on s techngy use & recommend improvements in h/w & s/w. Dvlp & direct s/w sys testing & validation procedures. Must be willing to travel & relocate for short periods of time for the above 2 positions. Programmer Analyst: Dsgn, dvlp, test, create & modify comp. appli. s/w & specialized utility prog. Anlyz user needs, align with data gathered & dvlp solutions. Use latest technlgs & tools in a web based environment. Programmer: Dsgn, test, create & modify comp. appli. Anlyz user needs & dvlp solutions. Manage backup. Apply w/2 copies of res. to HR, Xpedite Technologies, Inc. 8830 Stanford Blvd Ste#415, Columbia, MD - 21045

Computer Professionals for MD based IT Firm: Sr. Software Engineer: Research, dsgn, devlp code & test comp s/w systems, support & maintain existing appli. & systems to determine potential areas for change & improvements. Anlyz user needs & devlp s/w solutions. Perform unit tests & prepare test cases for defect tracking to improve s/w quality using latest tools & technlgs on diff. O/S. Sr. Programmer Analyst: Dsgn, devlp code & modify comp appli. s/w & specialized utility progrm. Anlyz user needs & devlp s/w solutions. Coordinate the installation, config. & admin. of comp progrm & systems using diff. tools & technlgs in object oriented programming languages & internet technlgy. Programmer Analyst: Dsgn, devlp, test, create & modify comp appli. s/w & specialized utility progr in a web environment. Anlyz user needs along with data gathered & devlp solutions. Maintain & troubleshoot systems. Manage backup & security. Traveling & relocation may be reqd. for all positions. Apply w/2 copies of res. to HR, Paradigm Infotech, Inc. 8830 Stanford Blvd Ste#312, Columbia, MD - 21045

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below:
Sales Solution Specialist; New York, NY; **#1615.1692**: Manage Google Go to Market Product Strategy. Exp incl: data & stats analysis; Excel finan modeling; data sys struct; track & measurement; strat plan; B2B mktng; & statistic tools. Up to 20% trvl req'd.
SW Eng Positions (NY, NY): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. incl:
#1615.2202: SW Eng or proj lead; C &/or C++; Python; design large scale distrib syst; & Multithread.
#1615.2262: - storage syst; distrib syst; & security.

Computer Professionals for NJ based IT Firm: Sr. SW Engineer: Plan, design, develop, test, enhance, customize & co-ordinate activities to implement advance s/w module components in complex computer environments using latest tools & technologies. Consult with users & management. Sr. Programmer Analyst: Plan, design, develop, test, enhance, customize & coordinate activities to implement advance s/w module components in complex computer environments. Analyze user needs & develop s/w solutions in web based environments. Must be willing to travel & relocate for short periods of time for both the above positions. Programmer Analyst: Design, develop, test, create & modify computer applications s/w & specialized utility programs. Use OOP languages as well as C/S applications. Analyze & develop s/w solutions. Apply w/2 copies of resume to HR, Nixsol, Inc. 53 Knightsbridge Road, Ste#216, Piscataway, NJ - 08854

Infosys Limited is in need of individuals to work full-time in Plano, Texas and various unanticipated locations throughout the U.S. We have multiple openings for each job opportunity, and are an Equal Opportunity Employer M/F/D/V. Please apply on-line at http://www.infosys.com/careers/apply-now/us-jobs.asp and search for the reference #(s) of interest listed below.

Technology Architect(s) – US needed to provide inputs on solution architecture based on evaluation/understanding of solution alternatives, frameworks and products. Will interact with clients to elicit architectural and non-functional requirements like performance, scalability, reliability, availability, maintainability. (Ref # Inf_EXTERNAL_58506404_2).

Consultant(s) (Domain) - US needed to help conduct requirements gathering, define problems, provide solution alternatives, create detailed computer system design documentation, implement deployment plan, and help conduct knowledge transfer with the objective of providing high-quality IT consulting solutions. (Ref # Inf_EXTERNAL_58872567_1).

Lead Consultant(s) (Products and Packages) - US needed to anchor different phases of the engagement including business process consulting, problem definition, discovery, solution generation, design, development, deployment and validation. (Ref # Inf_EXTERNAL_58498656_2).

Lead Consultant(s) (Domain) – US needed to anchor different phases of the engagement including business process consulting, problem definition, discovery, solution generation, design, development, deployment and validation. (Ref # Inf_EXTERNAL_58872560_2).

Principal Consultant(s) (Products and Packages) - US needed to lead the engagement effort for IT assignments from business process consulting and problem definition to solution design, development and deployment. Travel required. (Ref # Inf_EXTERNAL_58872509_3).

Consultant(s) (Products and Packages) – US needed to help conduct requirements gathering, define problems, provide solution alternatives, create detailed computer system, design documentation, implement deployment plan, and help conduct knowledge transfer with the objective of providing high-quality IT consulting solutions. (Ref # Inf_EXTERNAL_58483328_1).

Principal Consultant(s) (Domain) - US needed to lead the engagement effort for IT assignments, from business process consulting and problem definition to solution design, development and deployment. Travel required. (Ref # Inf_EXTERNAL_58872527_2).

Lead Consultant(s) (Infrastructure Management) - US needed to anchor due-diligence of customer IT infrastructure environments, as well as the design, detailing and transition of the assigned IT processes/modules. (Ref # Inf_Inf_EXTERNAL_58498683_2).

Infosys Limited has multiple, full-time openings in Plano, TX and various unanticipated locations throughout the U.S. Requires experience, depending on position. Equal Opportunity Employer M/F/D/V. Please apply online at: http://www.infosys.com/careers/apply-now/us-jobs.asp and search for the job # below. Apply to each job # of interest.

Group Project Manager-U.S.: needed in Plano, Texas, and various unanticipated locations throughout the U.S. to be responsible for delivery of a group of IT projects in a portfolio. (Job# Inf_EXTERNAL_58872563_3).

Project Manager-U.S.: needed in Plano, Texas, and various unanticipated locations throughout the U.S. to help gather requirements, define architecture, and determine scope to deliver IT solutions. (Job# Inf_EXTERNAL_58505563_3).

Project Manager-U.S. (Enterprise Solutions): needed in Plano, Texas, and various unanticipated locations throughout the U.S. to help gather requirements, define architecture, and determine scope to deliver IT solutions. (Job# Inf_EXTERNAL_58513875_2).

Project Manager-U.S. (Business Intelligence): needed in Plano, Texas, and various unanticipated locations throughout the U.S. to help gather requirements, define architecture, and determine scope to deliver IT solutions. (Job# Inf_EXTERNAL_58505680_3).

Project Manager-U.S. (Enterprise Application Integration): needed in Plano, Texas, and various unanticipated locations throughout the U.S. to help gather requirements, define architecture, and determine scope to deliver IT solutions. (Job# Inf_EXTERNAL_58505982_3).

Project Manager-U.S. (Testing): needed in Plano, Texas, and various unanticipated locations throughout the U.S. to perform activities to ensure that quality software work products are delivered on schedule, including coordination with clients and internal teams across the globe. (Job# Inf_EXTERNAL_58505993_3).

Project Manager-U.S. (Engineering): needed in Plano, Texas, and various unanticipated locations throughout the U.S. to help in application of industry standard methods for development to perform design tasks in concept design, preliminary design, detailed design, and testing support phases of the product development. (Job# Inf_EXTERNAL_58505736_2).

Project Manager-U.S. (Infrastructure Management): needed in Plano, Texas, and various unanticipated locations throughout the U.S. to help design, develop and deploy IT solutions for infrastructure environments, including evaluation of OS, DB, storage, network enterprise applications and middleware. (Job# Inf_EXTERNAL_58505950_3).

Technology Lead-U.S. (Enterprise Solutions): needed in Plano, Texas, and various unanticipated locations throughout the U.S. to design, develop, test and deploy specific modules for software products. (Job# Inf_EXTERNAL_58513754_2).

Technology Lead-U.S. (Business Intelligence): needed in Plano, Texas, and various unanticipated locations throughout the U.S. to design, develop, test and deploy specific modules for software products. (Job# Inf_EXTERNAL_58513748_1).

Technology Lead-U.S. (Enterprise Application Integration): needed in Plano, Texas, and various unanticipated locations throughout the U.S. to design, develop, test, and deploy specific modules for software products. (Job# Inf_EXTERNAL_58513793_2).

Technical Test Lead-U.S.: needed in Plano, Texas, and various unanticipated locations throughout the U.S. to test assigned modules for software products. (Job# Inf_EXTERNAL_58513805_2).

Technology Lead-U.S. (Engineering): needed in Plano, Texas, and various unanticipated locations throughout the U.S. to design, develop, test and deploy specific modules for software products. (Job# Inf_EXTERNAL_58513750_3).

Technology Lead-U.S. (Infrastructure Management): needed in Plano, Texas, and various unanticipated locations throughout the U.S. to design, develop and deploy IT solutions for infrastructure environments, including evaluation of OS, DB, storage, network enterprise applications and middleware. (Job# Inf_EXTERNAL_58513799_2).

Information Technology:
IT Corp., Aliso Viejo (Orange County), CA. has multiple openings at various levels for Project Managers to manage allocation, utilization cost, time schedules & standards with well-defined milestones & multiple openings for Test Managers to manage allocation, utilization of quality & testing resources in the project. Travel to unanticipated client sites throughout the U.S. required. Bachelor's Degree with 2 to 5 yrs. of exp. or Master's degree with 2 yrs. exp. Mail resume & position desired to Job Number 001RAUST - Attn: Coleen Ryan - UST Global Inc. 20 Enterprise 4th Floor, Aliso Viejo, CA 92656

Information Technology:
IT Corp., Aliso Viejo (Orange County), CA. has multiple openings at various levels for Business Analysts; Will work independently to define, test and implement project functional requirements; Design & Execute functional test procedures. Global delivery model exp. req. Travel to unanticipated client sites throughout the U.S. required. Bachelor's Degree with 2 to 5 yrs. of exp. or Master's Degree with 2 yrs. Mail resume to Job Number: 002RAUST - Attn: Coleen Ryan - UST Global Inc. 20 Enterprise 4th Floor, Aliso Viejo, CA 92656

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below:

Sales Solution Specialist (Mountain View, CA) **#1615.2721**: Plan, direct, & coordinate policies & programs to drive interest in Google products and services. Exp incl: AdWords; proj mgmnt; domestic & int'l online mrktng; agency bus industry knowledge; pitch & deliver tech solutions to key partners; & tech probl id & solving.

User Interface Designer (Mountain View, CA); **#1615.4034**: Define the user model & UI for new/existing Google products & features. Exp. incl: design web-based prod for a consumer-oriented wbste; CSS & HTML; Adobe Photoshop or Fireworks; & communicate ideas & rationale within a user-centered design.

Site Reliability Engineer (Mountain View, CA); **#1615.606**: Provide tecnnical support necessary to ensure full availability of Google online services. Exp. incl: troubleshoot, design & program large-scale, fault-tolerant distrib syst; maint & hot-deployment of live large-scale sw syst; multithread program; C++ & Python; OS internals & design principles; ntwrkng protocols & ntwrk mgmnt tools & techniques; Linux; & syst admin.

Test Engineering Manager (Mountain View, CA) **#1615.826**: Manage team of junior test engineers in testing Google products. Exp. incl: oo program C++, C#, Java, or Jscript; op syst & web concepts; dvlpmnt of multi-tiered server-client appl leverage Apache, Tomcat, Big Table, RPC, or equiv technologies; & manage jr eng. Up to 20% travel required.

Product Manager (Mountain View, CA) **#1615.1828**: Take responsibility for Google product from conception to launch. Exp incl: mobile tech industry; mobile web standards, such as those dvlped by IETF or W3C; mobile comm standards, such as CDMA or LTE; adv stat & database funct; & id & prioritization of prod opportunities & feasibility analysis.

Business Systems Integrator (Mountain View, CA) **#1615.3547**: Design analytical solutions that provide data to answer complex business decisions. Exp.incl: implement & customize of vendor sw/ERP syst; finance acct; supply chain & manufacture plan syst; prod lifecycle mgmnt; rel databases; SQL; full syst implement life-cycles, incl analysis, design, bldng, test, implement, & support.

SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include:

#1615.3477: C or C++; algorithms & math; diag bottlenecks; syst profile, tuning, & optimiz; Linux op syst, incl tools to manage Linux workstation, such as the command for file operation, the tools to edit, compile, and debug the program files, and the standard library used to develop C++ programs on Linux; large-scale distrib data process syst; design, prototype, implement, optimiz, & document proj related to web search syst, such as a feature in search result page or quality improvements of page ranking; sw arch; & web appl dvlpmnt tools.

#1615.420: C & C++; multithread; STL; Python; Java; DHT; Branch & Bound DFS; Dynamic Program; fast lookup data struct; & bldng of large-scale ntwrk & distrib syst.

#1615.725: data analysis & related methodologies; algorithm design & implement; Python & C++; & large data set or parallel syst.

#1615.4127 C & C++; Unix; TCP/IP; oo tech; algorithms; & multithread.

#1615.3767: algorithm design & dvlpmnt; Bash&/or Python; parallel program; C&/or C++; perf tuning; & Unix &/or Linux.

#1615.241: Design, develop, modify, and/or test software needed for various internet search engine company projects. Exp incl: coding, debug & test in Java , C or C++; distrib syst; oo & sw design; data struct & algorithms; inf retrieval; data mine or mach learn.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below:

Sales Strategy Sr. Assoc.(Mountain View, CA) **#1615.2034**: Execute business operations and strategy projects defined by Google's executive team. Exp include: financial plan; stat analytical tools; Excel; & data extraction using SQL & other script lang

Research Scientist (Mountain View, CA) **#1615.2172**: Research, develop and test Google products. Exp. incl: speech recognition; machine learning; & C++.

Business Systems Integrator (Mountain View, CA) **#1615.2137**: Design analytical solutions that provide data to answer complex business decisions. Exp. incl: C++, Java & SQL; Python, Perl, Shell or PHP; MySQL, SQL Server, or Sybase; data struct, algorithms,& complexity analysis; analyze & troubleshoot large-scale distrib syst; large syst sw design; financial syst &/or data whsng; & Unix &/or Linux.

Partner Technology Manager (Mountain View, CA) **#1615.793**: Take responsibility for Google product from conception to launch. Exp incl: XML, HTML, & script lang; Unix/Linux syst admin & shell script; TCP/IP, HTTP/HTTPS, & SSL/TLS; C/C++, Java, or Python.

SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include:

#1615.3830: design of new syst; scalable data; distrib syst; C &/or C++; Java; & Python.

#1615.3613: C, C++ &/or Java; large syst sw design & dvlpmnt; Unix/Linux; data struct, algcrithms, & sw design; Python, Jscript, or AJAX; database design & SQL; TCP/IP; & ntwrk prog.

#1615.1877: C,C++, Java, AJAX, XML, Python, SQL, Javascript, HTML, HTML5, CSS; oo lang; & syst. design specs.

#1615.3030: design & implement large scale distrib syst; HTML5 for write high-perf web appl using Closure, GWT & AppEngine; dvlp mobile appl for Android pltfrm; comp vision basics w/resource ltd mobile environ; & Java, Jscript, C++, Python, XML, & HTML4 CSS3. Up to 10% trvl req'd.

#1615.2960 – design, implement, test & maintain subsys; dev Jscript perf optimize & self-modifying code; design & implement differencing & merging algorithms for data struct in real-time collaborative web appl; dev & drive ext outreach prog; manage open source prog; publish tech content for developer; provide end-user tech support; & reverse eng front-end tech. Up to 25% travel required.

Software Engineer in Test (Mountain View, CA) **#1615.3203**: Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include: dvlpmnt of code in Python & Java; multithread; client-server arch; distrib storage syst; & launch and maint svcs in prod environ.

Staff SW Engineer; (Mountain View, CA) **#1615.3279**: Design, develop, modify, and/or test software needed for various internet search engine company projects. Exp incl: backend infrastruct; infrastruct & ranking components; distrib storage syst; & perf optimization.

Site Reliability Engineer (Mountain View, CA) **#1615.230**: Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include: RPC clients & servers distrib syst arch: syst perf analysis & tuning control syst; sys admin; distrib appl deployment; proj mgmnt; & mentor.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below:

SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include:

#1615.3401: Java & GWT; multithread, info retrieval & data mine; design patterns, esp dependency injections; oo analysis & design; UI design & implement; web appl & multi-tiered syst; & Linux.

#1615.1092: Linux/Unix oper syst internals; write kernel ext in C & C++; OS driver dvlpmnt process; kernel-space code debug; register-level prog; & SCM tech.

#1615.804: C, C++ &/or Java; mach learn; data struct, algorithms & sw design; large systems sw design & dvlpmnt; Unix &Linux; Python, Jscript or Ajax; & ntwrk prog.

#1615.2034: financial plan; stat analytical tools; Excel; & data extraction using SQL & other script lang.

#1615.3203: dvlpmnt of code in Python & Java; multithread; client-server arch; distrib storage syst; & launch & maintain svc in prod environ.

#1615.230: Remote Procedure Call clients & servers distrib syst arch: syst perf analysis & tuning control syst; sys admin; distrib appl deployment; proj mgmnt; & mentoring.

#1615.2057: C & C++, multithread & STL; large scale data index; parallel & distrib computing; hashing, graph algorithms & dynamic program; & mach learn for info retrieval.

#1615.3107: web dvlpmnt & web site admin; C & C++; STL & multithread; Python, Jscript, AJAX, PHP, SQL, R, & Bash; read, write & speak Japanese.

#1615.4056: formal lang specs using Grammars; ANTLR; XML Parsing & Normalization; JUnit; & Java. CSS; ActionScript; & Adobe Flash & Flex.

Site Reliability Engineer (Mountain View, CA); **#1615.621** Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include: Unix & Linux syst; Python & Java; tech troubleshoot & perf tune; rev control; test driven dvlpmnt; large scale distrib syst; dvlpmnt of web-based appl; & multi-tiered syst, SQL & UI design & implement.

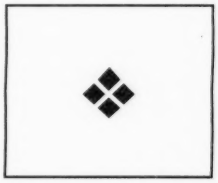
Android Kernel Engineer (Mountain View, CA); **#1615.1682**: Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include: embed hw & SOC kernels & low level sw for embed devices; Linux Kernel; Comm protocols, incl USB, MIPI HIS, & I2C; C prog; & processor arch & assembly.

Ameresco Inc. has openings for Data Integration Specialist in Islandia, NY at its subsidiary Applied Energy Group. Convert data from flat files into a normalized database structure. Develop ETL packages using SQL Server Integration Services. Write and collaborate on technical specifications-database and batch design, ETL packages. Travel/relocation required. Must have Masteris or foreign equivalent+ 2 yrs. experience in SSIS and SPROC. Please send resume to 1377 Motor Pkwy, Suite 401, Islandia, NY 11749: Attn: H.R. Manager.

Information Technology:
IT Corp., Aliso Viejo (Orange County), CA. has multiple openings at various levels for Software Architects – General; Java; Microsoft & Mainframe. Independently design, document & develop software architecture & high level design for large or mid-size projects; Exp. with global delivery model including architecting a project. Travel to unanticipated client sites throughout the U.S. required. Bachelor's Degree with 2 to 5 yrs. exp. or Master's Degree with 2 yrs. of exp. Mail resume & position desired to Job Number 003RAUST - Attn: Coleen Ryan - UST Global Inc. 20 Enterprise 4th Floor, Aliso Viejo, CA 92656

Seeburger, Inc. in Atlanta, GA is seeking a Project Manager to direct engin. activities of global bus integrat'n sols projects. Min. reqs: Master deg. (or for. deg. equiv.) in Engin. / Ind. Mgt. / closely rel fld & 2 yrs exp provid'g SAP XI consult. svs. In lieu of Master deg., will accept Bach. deg. (or for. deg. equiv.) in Engin. / Ind. Mgt. / closely rel fld & 5 yrs post Bach. exp provid'g SAP XI consult. svs. Both Bach. & Master deg. reqs. 2 yrs exp w/ bus analysis, mapp'g, EDI, integrt'n & translt'n technlgs. Send resume to Job Code: NVS, M. Dan Marischuk, Controller, Seeburger Inc., 1230 Peachtree Street, N.E., Suite 1020, Atlanta, GA 30309 (No Ph Calls).

Information Technology:
IT Corp., Aliso Viejo (Orange County), CA. has multiple openings at various levels for Systems Analysts – General; Java; Microsoft and Mainframe. Will collect, review, analyze & recommend technology & tools; Use independent judgment & discretion to analyze computer system capabilities; Knowledge & hands on exp. of Software Development life cycle. Travel to unanticipated client sites throughout the U.S. required. Bachelor's Degree with 2 yrs. of experience. Mail resume & position desired to Job Number: 004RAUST – Attn: Coleen Ryan – UST Global Inc. 20 Enterprise 4th Floor, Aliso Viejo, CA 92656



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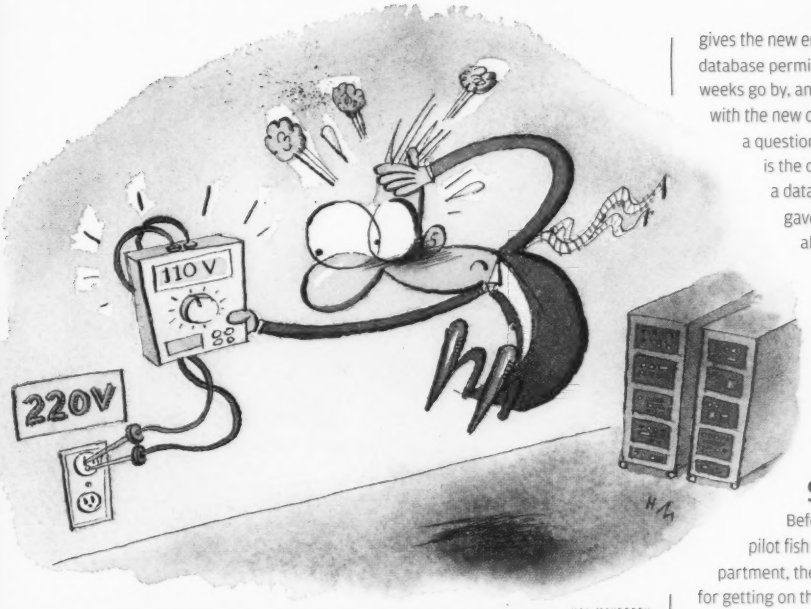

HAL MAYFORTH

95% Done, Only 95% to Go

Pilot fish gets a call from his boss over the weekend: The company's midrange system is down, the boss is out of town, and fish needs to drive in and take a look at the problem. "When I got into the office, I saw that all the lights on the UPS were blinking and the entire rack was dead," says fish. He quickly confirms that the UPS needs to be replaced and orders a new one. Then he rewires the power distribution unit into a 220-volt outlet on the other side of the server room and powers the rack on – and everything comes up except the interface to the storage array. OK, fish figures, just one small bit of work left to go. Twelve hours of trouble-shooting, parts-swapping and vendor calls later, it's 1:30 a.m. and fish is at his wit's end – until someone finally gets the bright idea to check the voltage coming out of the wall. It's 110 volts, not 220. "Everything in the rack works fine with 110 volts except the interface unit, which requires 220," grumbles fish. "Once we moved the plug to a known-good 220-volt outlet, everything worked fine. The next day, I made a label for the '220' outlet that showed it was, in fact, wired for 110."

The Expert

This contractor pilot fish is working as the sole database administrator in a small subsidiary – which means he can run things his own way. One day, "a new employee arrived and wasted no time letting me know that she was a database expert," says fish. So he gives the new employee generous database permissions. Perhaps two weeks go by, and a casual discussion with the new database user leads to a question. "She asked, 'What is the difference between a database and a table?' I gave her a quick answer, along the lines of 'a database is a collection of tables.' Then, confidence destroyed, I raced to my desk to pull the new employee's permissions back to read-only."

Spoilsport!

Before this manager pilot fish arrived in his IT department, the official procedure for getting on the network was very specific. "Before being allowed access to the company intranet, you had to fill in a form stored on the intranet," says fish. You could borrow another person's sign-on to print the form, but not do anything else. The same form was used to request Internet access. You had to state a reason for wanting Internet access, but there were no restrictions as to what was a valid reason. "I would love to have put down 'to surf for porn' and watched the result," says fish. He changed both procedures pretty quickly – you can now access the intranet from day one, and Internet access is filtered automatically unless you have a business reason for questionable sites.

» **No question,** Sharky wants your true tale of IT life. Send it to me at sharky@computerworld.com, and you'll snag a snazzy Shark shirt if I use it.

CHECK OUT Sharky's blog, browse the Sharkives and sign up for home delivery at **computerworld.com/sharky**.

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PAUL GLEN

Influence 101

We in IT have a very limited understanding of what influence is.

NOBODY BELIEVES that "CIO" stands for "chief influence officer." CIOs themselves know better, though they'd like to contribute to decision-making. I recently facilitated a conversation among a group of CIOs who collectively seemed both mystified and hurt by their own lack of influence within their organizations. "I give them what they want, but when it comes to the big decisions, I don't get a seat at the table" was a typical sentiment.

The consensus was that, if organizations would seek out the CIO's perspective when deliberating on decisions, they could reduce costs, become more competitive and avoid costly mistakes.

So we discussed how to become more influential. The general view was that CIOs have to better publicize the IT department's successes and work harder to build relationships with business executives. There's nothing wrong with these measures, except that they aren't nearly enough. We in IT have a limited understanding of what influence is.

In its purest form, influence is about one's ability to affect the opinions, emotions or behavior of others. But it isn't enough to influence the decisions that are made. To affect the agenda and direction of the organization, you need to influence which questions are considered.

To a large degree, IT isn't influential because we conflate influence with input. We believe that decision-makers should consult us because of the inherent value of our knowledge. We are confused when this doesn't happen, not realizing that executives rarely seek to be influenced; they expect to be lobbied. While we wait passively to share information, others are driving the agenda.

And even when we are consulted, our input can fail to persuade because we misapprehend how decisions are made. We believe that decisions should be based on a purely analytical process. We pile facts in the middle of the table. Weigh the facts and decisions should be obvious, based on an objectively verifiable good. But decisions don't happen in the middle of the table. Human decision-making is a fundamentally interior process blending emotions, intuition and information.

As geeks, we don't like to trespass on other people's interior experiences and subjective reality. That's the realm of emotions, and we don't do emotions. We don't like to talk about them, think about them or attempt to make others feel them. And strategizing about how to make someone feel a certain way seems wrong.

But we can't influence our business partners without understanding their interior experience. Geeks have become reasonably good at understanding business processes, but we rarely consider the human experience of inhabiting those processes. Without stepping into other people's worldview, we have no hope of gaining influence.

To begin to make IT influential, we must take these two steps:

1. Overcome our resistance to the emotional nature of decision-making and agenda-setting. We must become fluent in the language of feelings, and learn to both empathize with and elicit them.

2. Make influential relationships part of everyone's job. Influence takes place at every level of the organization, from boardroom to help desk. Everyone in IT has an influence on how our business partners experience us and our technology.

To give our organizations the full value of our contributions, our knowledge and our products, we must seek to become influential, not wait for influence to be bestowed upon us. Our organizations need us to step up. Even if it isn't our ambition to be influential, it is our obligation. ◆

Paul Glen, CEO of Leading Geeks, is devoted to clarifying the murky world of human emotion for people who gravitate toward concrete thinking. His newest book is *8 Steps to Restoring Client Trust: A Professional's Guide to Managing Client Conflict*. You can contact him at info@leadinggeeks.com.

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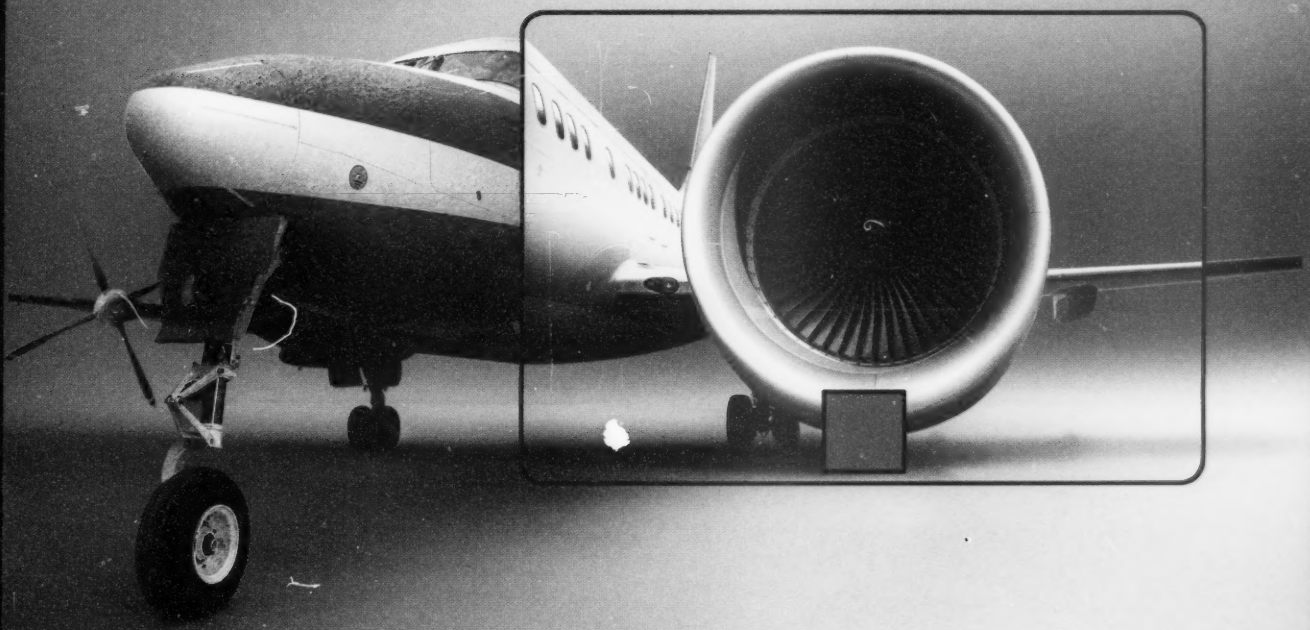

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